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# USDA Human Nutrition Research and Education Activities, FY 1994

## Report to Congress



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This report was prepared under the auspices of the U.S. Department of Agriculture's Human Nutrition Coordinating Committee. USDA agency representatives who assisted in preparing this report were Jacqueline Dupont, Alanna Moshfegh, Frankie N. Schwenk, Agricultural Research Service; Elizabeth Crosby, Agricultural Marketing Service; Judith Putnam, Economic Research Service; Jay Hirschman, Food and Nutrition Service; Melvin M. Mathias and Jan Singleton, Cooperative State Research Education and Extension Service; Sandy Facinoli, National Agricultural Library; and Lynn Dickey, Food Safety and Inspection Service.

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# Contents

Abbreviations .....	iii
I. Introduction .....	1
A. Charge .....	1
B. Legislative .....	1
1. Food Labeling .....	1
C. Changes in Resources or Infrastructure .....	2
II. Human Nutrition Research Activities .....	2
A. General .....	2
B. Normal Requirements for Nutrients .....	4
1. Improving Human Nutrition Requirements for Optimal Health Program Within the National Research Initiative Competitive Grants Program .....	4
2. Infants and Children .....	5
3. Maternal Nutrition .....	5
4. Adult Nutrition .....	6
5. The Elderly .....	6
6. Nutrient Functions .....	6
C. Role of Nutrition in Promoting Health and Preventing Diet-Related Disorders .....	9
1. Body Composition .....	9
2. Dietary Lipids .....	9
3. Dietary Fiber and Carbohydrates .....	10
4. Vitamins and Minerals .....	11
D. Food Composition and Nutrient Bioavailability .....	11
E. Food and Nutrition Monitoring Research .....	12
1. U.S. Food and Nutrient Supplies .....	12
2. Food Consumption Surveys .....	13
a. Survey Operations .....	15
b. Survey Systems .....	15
c. Survey Planning .....	16
d. Data Release .....	16
e. Survey Results .....	16
f. Research on Determinants of Dietary Status and Survey Methods .....	17
F. Government Policies and Socioeconomic Factors .....	17
G. Food and Nutrition Information and Education Research .....	21
1. Establishing Dietary Guidance Policy .....	21
H. Food Marketing and Demand .....	25
1. Studies of Food Supplies, Prices, Expenditures, Marketing Costs, Safety, Technology, and Consumer Demand .....	25
2. Studies on Improving Food Marketing .....	28
III. Nutrition Education and Information .....	28
A. USDA's Responsibility To Ensure the Federal Government "Speaks With One Voice" When Issuing Dietary Guidance .....	29
B. Programs Initiated or Expanded .....	29



## Contents—Continued

1. Food and Consumer Services Programs .....	29
2. Cooperative Extension System .....	30
a. General .....	30
b. The Nutrition, Diet, and Health Base Program .....	30
c. National Initiatives .....	30
d. Special Programs .....	31
e. Impact .....	32
f. Program Highlights .....	32
3. Agricultural Marketing Service Programs .....	32
4. National Agricultural Library (NAL) Programs .....	33
C. Nutrition Education and Information Highlights .....	34
1. Implementation of the Dietary Guidelines for Americans in the Child Nutrition Programs .....	34
2. Nutrient Standard Menu Planning Method for the National School Lunch and School Breakfast Programs .....	35
3. Breastfeeding Promotion Efforts .....	36
4. 1890 Institution Capacity Building Grants Program .....	36
5. Recruitment and Retention of Public Health and Community Nutritionists .....	36
6. National Needs Graduate Fellowship Grants Program .....	38
7. Higher Education Challenge Grants .....	38
8. Nutrition Education and Training Program .....	38
9. Food Stamp Program Participants .....	39
10. Other Nutrition Education Efforts .....	39
IV. Funding Levels .....	39
V. Coordination and Advisory Mechanisms .....	48
A. Coordination Within the Federal Sector .....	48
B. Coordination Within USDA .....	49
1. General .....	49
2. Extension Targets Vulnerable Audiences .....	50
3. Cooperative Regional Research Projects .....	50
4. Economic Research Service and Center for Nutrition Policy and Promotion Cooperation on Food Supply Data .....	51
C. Coordination With the Private Sector and International Organizations .....	52
D. Advisory Groups .....	52
VI. Benefits .....	53



## Abbreviations

AFDC	Aid to Families with Dependent Children
AMS	Agricultural Marketing Service
ARS	Agricultural Research Service
CDC	Centers for Disease Control and Prevention (DHHS)
CES	Cooperative Extension System
CNPP	Center for Nutrition Policy and Promotion
CSFII	Continuing Survey of Food Intake of Individuals
CSREES	Cooperative State Research, Education, and Extension Service
CSRS	Cooperative State Research Service (USDA)
DHHS	Department of Health and Human Services
DHKS	Diet and Health Knowledge Survey
EFNEP	Expanded Food and Nutrition Education Program
ERS	Economic Research Service (USDA)
ES	Extension Service (USDA)
FCS	Food and Consumer Services
FDA	Food and Drug Administration (DHHS)
FDPIR	Food Distribution Program on Indian Reservations
FGS	Food Grouping System
FNS	Food and Nutrition Service (USDA)
FSIS	Food Safety and Inspection Service (USDA)
FSP	Food Stamp Program
HFCS	Household Food Consumption Survey
HNIS	Human Nutrition Information Service (USDA)
IBNMRR	Interagency Board for Nutrition Monitoring and Related Research
ICHNR	Interagency Committee of Human Nutrition Research
NAL	National Agricultural Library
NCHS	National Center for Health Statistics (DHHS/CDC)
NHANES	National Health and Nutrition Examination Survey
NLEA	Nutrition Labeling and Education Act
NNMRRP	National Nutrition Monitoring and Related Research Program
TEFAP	The Emergency Food Assistance Program
USDA	United States Department of Agriculture
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children



# USDA Human Nutrition Research and Education Activities: FY 1994 Report to Congress

## I. Introduction

### A. Charge

A U.S. Department of Agriculture (USDA) comprehensive plan for implementing a national food and human nutrition research and education program was submitted to Congress in December 1986. This plan was issued in accordance with the provisions of section 1452(a) of the National Agricultural Research, Extension, and Teaching Policy Act Amendments of 1985 (7 USC 3173 note). Section 1452(b) of this act requires the Secretary of Agriculture to submit an annual report on the human nutrition research activities conducted by USDA. Such reports have been submitted every year beginning in FY 1987.

#### • Nutrition Education and Research Programs

USDA was reorganized in FY 1994 and the structure was made official on October 16, 1994.

The Nutrition Education and Research Coordinating Council was formed in May 1994. It is cochaired by the Under Secretary for Food, Nutrition, and Consumer Services and the Under Secretary for Research, Education, and Economics. Some agencies' names and organizational structures changed. The present structure of human-nutrition-related program organization is shown below.

Under Secretary for Food, Nutrition, and Consumer Services

Food and Consumer Services (formerly Food and Nutrition Service)

Center for Nutrition Policy and Promotion (formerly Nutrition Education Division of the Human Nutrition Information Service, and Family Economics Research Group of the Agricultural Research Service)

Under Secretary for Research, Education, and Extension

Agricultural Research Service (includes monitoring and nutrient database divisions of former HNIS)

National Agricultural Library (now part of ARS)

Cooperative State Research, Education, and Extension Service

Under Secretary for Food Safety

Food Safety and Inspection Service

Assistant Secretary for Marketing and Regulatory Programs

Agricultural Marketing Service

Office of Communications

### B. Legislative

#### 1. Food Labeling

Enactment of the Nutrition Labeling and Education Act of 1990 (NLEA), Public Law 101-535, led to a comprehensive revision of food labeling regulations. The act amends the Federal Food, Drug, and Cosmetic Act and, in general, requires mandatory nutrition labeling of food products regulated by the Food and Drug Administration (FDA). In addition, USDA initiated its own effort to update meat and poultry labels in harmony with the FDA reform.

#### • Nutrition Labeling Regulations

USDA issued final rules on January 6, 1993, requiring nutrition labeling on meat and poultry products. The rule permits voluntary labeling on single-ingredient, raw meat, and poultry products.

Food Safety and Inspection Service (FSIS) and FDA have worked closely since 1989 to develop and publish similar regulations for the nutrition labeling of food products. As a result, most food labels provide the same types of information in the same format, making it easier for consumers to compare the nutrient profiles of the foods they purchase.

FSIS's regulations parallel FDA's to the greatest extent possible. Exceptions reflect differences in the types of foods regulated by each agency.

FSIS later published corrections and technical amendments to the final rule. The corrections address inconsistencies in the regulations and amend unintended technical consequences. FSIS corrected the terminology for extra lean ground beef. The amendments adopted changes in cross-referenced sections, which are associated with FDA's corrections, and in technical amendments relating to metric quantities, servings per container, reference amounts, nutrient content claims, saturated fat-free claims, foods for infants and children under 4, and packages with less than 12 square inches.

In 1994, FSIS published technical amendments that confirmed an interim rule and clarified FDA's cross-referenced provisions for serving sizes, nutrient content claims, and labeling formats. The interim rule includes provisions for nutrition labeling on small packages, small business exemptions, revisions of the definitions of "insignificant amount" and "lean," and inclusion of additional product categories for serving sizes. On May 10, 1994, FSIS and

FDA issued similar final rules regarding use of the term "healthy." These regulations prescribe limits on total fat, saturated fat, cholesterol, and sodium and require minimum levels of one or more of the six essential nutrients on the label. The effective date for rules on labeling meat and poultry products as "healthy" was November 10, 1995; sodium limits were phased in on that date.

On May 27, 1994, the President signed into law S. 2087, which extended the compliance date for certain FDA nutrition-labeled products to August 8, 1994. Continuing its concurrence with FDA, FSIS published a notice giving the effective date of the final nutrition regulations as July 6, 1994, but extending the compliance date to August 8, 1994.

In response to comments received about the final regulations, FSIS proposed to amend Federal meat inspection regulations by permitting percentage labeling for lean and fat on ground beef and hamburger, provided the product labeling contains nutrition labeling.

FSIS published a rule on August 8, 1994, to define the information panel and allow options for displaying nutrition information.

FSIS also published a health claims proposal. It complements FDA's rule by permitting only eight claims associating dietary intake to the prevention of heart disease, hypertension, cancer, and osteoporosis. The permissible claims are those which FSIS and FDA recognize as being scientifically substantiated.

#### • Other Food Labeling Regulations

As part of its program to control meat-borne pathogens and to educate food handlers about preventing food-borne illness, FSIS is requiring meat and poultry products that are not ready to eat to carry safe-handling instructions. The effective dates were May 27, 1994, for ground beef products and July 6, 1994, for other products.

### C. Changes in Resources or Infrastructure

The Human Nutrition Information Service (HNIS) was eliminated as an agency and its mission and functions were reassigned. Activities related to nutrition monitoring and maintenance of the National Nutrient Database were assigned to the Agricultural Research Service (House report 103-153). The education, promotion, and survey data analysis functions were assigned to Food, Nutrition, and Consumer Services by the Secretary of Agriculture.

## II. Human Nutrition Research Activities

### A. General

Human nutrition research activities are presented under six areas as detailed in the national plan:

- normal requirements for nutrients
- role of nutrition in promoting health and preventing diet-related disorders
- food composition and nutrient bioavailability
- food and nutrition monitoring research
- government policies and socioeconomic factors
- food and nutrition information and education research.

USDA conducts research on the role of nutrients in the reduction or prevention of nutrition-related disorders and the promotion of robust health throughout life. The research programs are not directed to treatment of disease. The focus is on normal nutrient requirements and content and bioavailability of food nutrients.

The Agricultural Research Service (ARS) is USDA's principal research agency. Its research on human nutrition is largely conducted at five human nutrition research centers. Each center has different research objectives and contributes to solutions of high-priority national problems. The human nutrition research centers are listed following:

*Beltsville Human Nutrition Research Center*, Building 308, BARC-East, Beltsville, MD 20705; Dr. Joseph Spence, director, (301) 504-8157. Its history can be traced to 1894 when Federal funds were provided for nutrition research at Wesleyan University in Middletown, CT. It moved to Washington, DC, in 1906 and to Beltsville, MD, in 1941. Research is conducted to examine nutrition/gene relationships in the diverse population to better form recommendations for individuals' and groups' nutrient needs. The center is responsible for leadership in food composition methodology and maintains the National Nutrient Data Bank. Food consumption monitoring is conducted to determine national patterns and needs of special groups.

*Grand Forks Human Nutrition Research Center*, P.O. Box 7166, University Station, Grand Forks, ND 58202; Dr. Forrest Nielsen, director, (701) 795-8456. Established in 1970, the center continues its pioneering research on human mineral and ultratrace element requirements for health and disease prevention and is leading in the development of systems analysis of nutrient requirements.

*Western Human Nutrition Research Center*, P.O. Box 29997, The Presidio, San Francisco, CA 94129; Dr. Janet C. King, director, (415) 556-9697. Established in 1980, the center conducts research to develop improved methods for monitoring and evaluating human nutritional status and the relationship of dietary intake, physical exercise, and genetics in healthy weight.

*Jean Meyer Human Nutrition Research Center on Aging*, Tufts University, 711 Washington Street, Boston, MA 02111; Dr. Irwin Rosenberg, director, (617) 556-3330.



The center was established in 1979. Research is concerned with identifying the nutrient needs of people as they age and limiting the risk of cardiovascular diseases, cancer, osteoporosis, immune function disorders, cataract formation, and loss of cognitive and physical function.

*Children's Nutrition Research Center*, 1100 Bates Street, Houston, TX 77030; Dr. Dennis Bier, director, (713) 798-7000. The center was established in 1979 in connection with Baylor College of Medicine. Research is conducted on establishing the nutrient requirements needed to prevent low-birth-weight babies, particularly in pregnant adolescents, and nutrient needs of children to sustain a healthful life.

Research on the nutritional qualities of plants and animals is conducted at ARS regional research laboratories in Peoria, IL, Ithaca, NY, and Albany, CA.

The Cooperative State Research Service, now the Cooperative State Research, Education, and Extension Service (CSREES), is the interfacing and coordinating agency for the USDA research organizations, the 59 designated State and territorial agricultural experiment stations, and the 1890 colleges and Tuskegee University. Money, appropriated by Congress, is administered through CSREES to each State on a formula basis. Before the States can spend the money, projects are peer reviewed. The States have a large degree of freedom in allocating the money, other than submitting projects for approval and submitting annual progress reports. The farm bills also authorized research and higher-education special and competitive grant programs. Research priorities are recommended by the State agricultural experiment station directors to USDA and then incorporated into the Department's annual request for funds from Congress.

Nine regional research projects and three special grants typify the nutrition research currently under way at State experiment stations. The projects cover (1) nutrient bioavailability; (2) health maintenance aspects of dietary recommendations designed to modify lipid metabolism; (3) behavioral and health factors that influence the food consumption of young adults; (4) assessment of nutritional risk in the elderly; (5) evaluation of effective intervention methods to improve the quality of well-being of rural elders; (6) dietary fat and fiber: knowledge, perceived risk, and dietary practices; (7) changing patterns of food demand and consumption behavior; (8) food safety through discovery and control of natural and induced toxicants and antitoxicants; and (9) private strategies, public policies, and food system performance. Special projects covering human nutrition were conducted at Cornell University on integration of nutrition goals and food systems; at Iowa State University on designing foods to improve nutrition, and at Louisiana State University on dietary fat, food intake, energy expenditure, and body composition.

The Nutrition, Food Safety, and Health Division of the National Research Initiative Competitive Grants Program is also administered by CSREES. Two program areas were supported in FY 1994. The primary objective of the Improving Human Nutrition for Optimal Health Program is to support research that will contribute to our understanding of optimal human nutrition, including specific human nutrient requirements of individuals and different age groups and the factors affecting these requirements. The Ensuring Food Safety Program emphasized increasing our understanding of the disease-causing microorganisms that contaminate food, with the goals of decreasing food-borne illnesses and providing improved detection methods to eliminate these hazards.

CSREES also funds work in human nutrition via grant programs administered by the Office of Higher Education Programs. The USDA National Needs Graduate Fellowship Grants Program awards fellowships to U.S. colleges and universities in six areas having shortages of expertise, including human nutrition and food science. Three areas are funded each alternating year. The 1890 Institution Capacity Building Grants Program provides support to the 1890 land-grant institutions and Tuskegee University for the purpose of advancing teaching and research projects in targeted high-priority areas. The Higher Education Challenge Grants Program provides support to U.S. colleges and universities to enhance their educational programs in the food and agricultural sciences.

Food and Consumer Services (FCS) is responsible for administering and performing policy research for domestic food assistance and nutrition education programs, including the Food Stamp Program, the child nutrition programs (which comprise the National School Lunch Program, the School Breakfast Program, the Child and Adult Care Food Program, and the Summer Food Service Program), and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Studies include the effectiveness of nutrition intervention, growth management and implementation of technological developments, participant characteristics, and service delivery options. Most studies are conducted through competitively awarded contracted research, with some use of cooperative agreements, targeted grants, and in-house analyses.

The Economic Research Service (ERS) conducts a wide variety of research and analysis on food and agricultural issues. Research is conducted on food consumption practices and the effects of government policies and socioeconomic factors on food consumption. These studies use data from existing surveys, such as the Bureau of Labor Statistics' Continuing Consumer Expenditure Survey, USDA's system of nationwide food consumption surveys, and the Department of Health and Human Services' (DHHS) Health and Nutrition Examination Survey.

Ongoing research at ERS analyzes effects of existing and alternative food and agricultural policies on food consumption, dietary levels, expenditures, and the nutritional status of target populations.

## **B. Normal Requirements for Nutrients**

### **1. Improving Human Nutrition Requirements for Optimal Health Program Within the National Research Initiative Competitive Grants Program**

The program areas emphasized are (1) bioavailability of nutrients; (2) interrelationship of nutrients; (3) nutrient requirements of healthy individuals in all age groups; (4) mechanisms underlying the relationship between diet and health maintenance, such as the effects of nutrients on the immune system; (5) cellular and molecular mechanisms underlying nutrient requirements, including the modulation of gene expression by nutrients; and (6) food consumer behavior, including identifying and developing methods to overcome obstacles to adopting healthful food habits, to convey knowledge to target audiences, and to ascertain factors that affect food choices. In FY 1994, 27 grants totaling \$4.12 million were awarded. Listed below are the projects supported:

- effects of lactic cultures on gastrointestinal immune function, \$150,000/3 years
- polyunsaturated fatty acids and macrophage adherence function, \$175,000/2 years
- new response tests for measuring vitamin A status, \$190,000/3 years
- effects of zinc supplementation on growth of breast-fed infants, \$190,000/3 years
- free living energy expenditure predicted from combined heart rate, heart rate variability, and physical activity, \$72,000/2 years
- use of intrinsically labeled foods to characterize bioavailability and kinetics of calcium and magnesium in children, \$170,000/3 years
- optimizing nutrient intake for prolonged visual function, \$220,000/3 years
- histamine, diet, and food intake, \$110,000/2 years
- optimal dietary complex carbohydrate to promote bifidobacteria and prevent colon cancer, \$147,000/3 years
- vitamin A and sympathetic neuronal development, \$115,000/2 years
- iron metabolism and T-lymphocyte proliferation, \$165,000/3 years
- lipids modulate the immune response via membrane/cytoskeleton interactions, \$130,000/3 years
- FASEB [Federation of American Societies for Experimental Biology] summer conference on retinoids, \$10,425/1 year
- metabolism of all-trans and 9-Cis beta-carotene to biologically active retinoids, \$140,000/2 years
- newborn piglet as model to evaluate new sources of parenteral energy for low-birth-weight infants, \$152,388/3 years
- impact of dietary protein on bone turnover, \$206,000/3 years
- energy expenditure of obese pregnant women, \$155,000/3 years
- effects of zinc on thyroid hormone receptor function, \$160,000/3 years
- neural responses to disproportionate amino acid diets: role of monoamines, \$154,000/3 years
- bioavailability of folate in foods, \$200,000/3 years
- effect of passive smoking on nutrient intake and blood antioxidants in children, \$130,000/2 years
- nutrient partitioning in transgenic mice overexpressing GLUT4 in fat, \$179,000/3 years
- a molecular approach to copper bioavailability, \$175,000/3 years
- molecular mechanisms of age and vitamin E-induced changes in macrophage PGE2 production, \$128,000/2 years
- regulation and processing of lysyl oxidase, \$132,000/2 years
- studies on how tissue pools of vitamin A are generated, \$195,000/2 years
- effect of current fat recommendations on physiologic parameters, \$170,000/2 years



## 2. Infants and Children

- A Simple Strategy Improves Weight Gain in Nursing Low-Birth-Weight Infants

Low-birth-weight infants fed their mothers' milk often gain weight at a lower rate than they do in utero. This low rate may result from a limited intake of nutrients, despite human milk fortification with added protein, minerals, and carbohydrates. The lipid content of hindmilk is known to be 2-3 times greater than that of foremilk. Thus, human milk was fortified with its hindmilk fraction to increase the endogenous lipid content. Infants fed their mothers' fortified milk had significant weight gain; the increment in fat concentration of the hindmilk was directly related to the rate of weight gain in all infants. This simple lactoengineering technique has great potential for supporting weight gain in low-birth-weight infants.

- Girls Need More Calcium at Young Age

Puberty is recognized as a period of maximal growth and bone formation. As much as 97 percent of total body calcium may be accumulated in girls before they are 16 years of age. At the Children's Nutrition Research Center, Houston, the rate of calcium deposition in bone and the size of the exchangeable calcium pool in bone were measured in 50 girls ages 5 to 16, using intravenously administered isotopic calcium. The lowest bone calcium deposition rates were found in the girls who were more than 24 months postmenarche. Current recommendations for calcium intake in children, however, do not suggest an increased intake until 11 years of age, which is well after the onset of puberty in many girls. Furthermore, it is unlikely that increasing calcium intake postpuberty would significantly increase bone calcium deposition rates, and hence, density. The results suggest that dietary patterns which will promote mineralization in girls should be encouraged throughout the early to midpubertal period. The current recommended daily allowance for calcium may be inadequate and put these children at risk for osteoporosis as adults.

## 3. Maternal Nutrition

- Zinc Metabolism in Pregnant and Lactating Women

During pregnancy, the need for zinc increases by about 25 percent; during the first months of lactation, the need rises to about 80 percent. Thirteen healthy women living in Berkeley, CA, participated in a study of zinc nutrition from before conception through lactation to determine how those needs are met. Two stable isotopes of zinc were given, one orally and the other intravenously, to measure zinc absorption and the excretion of zinc from the body. Zinc intakes increased from 11 to about 14 mg zinc/day during pregnancy; intake declined to prepregnancy levels during lactation. This increase in zinc intake was due, in part, to an

increased intake of food during pregnancy. Plasma zinc concentrations dropped about 25 percent by late pregnancy, and the proportion of total plasma zinc bound to albumin (the form most available to tissues) also declined. Although the need for zinc during lactation was greater than that during pregnancy, plasma zinc concentrations increased and the proportion bound to albumin also increased. This implies that the adjustments in plasma zinc observed during pregnancy were due to hormonal changes, rather than changes in need. Urinary zinc excretion doubled during pregnancy; there was no evidence of a reduction in endogenous fecal zinc to compensate for the rise in urinary zinc. The amount of zinc absorbed from a standard meal increased during lactation; there was no change in zinc absorption during pregnancy.

In summary, these women, who had adequate food intakes, met the additional need for zinc during pregnancy by an increase in zinc intake. During lactation, when the demand was considerably greater and food intake declined, the rate of zinc absorption increased. The demand for zinc during pregnancy elicits a different metabolic response than that of lactation.

- Vitamin B<sub>6</sub> Status Indices Are Lower in Pregnant Women

The cause of reduced plasma pyridoxal-5'-phosphate (PLP) concentration and the validity of plasma PLP concentration as an indicator of vitamin B<sub>6</sub> status during pregnancy are not well understood. In a study conducted at Purdue University, pregnant and nonpregnant women consumed a controlled diet for 5 days to exclude dietary intake as a factor in altered vitamin B<sub>6</sub> metabolic utilization. Plasma PLP and pyridoxal (PL) concentrations were significantly lower and higher, respectively, and plasma PL plus PLP concentration was significantly lower during pregnancy. When plasma PLP and PL concentrations were normalized based on plasma albumin concentration, the differences were less marked but were still significant. The erythrocyte aspartate aminotransferase activity coefficient was significantly greater in pregnant women, which is a further indication of reduced vitamin B<sub>6</sub> status. No difference was observed in the urinary excretion of 4-pyridoxic acid between the pregnant and nonpregnant women. Results of this study demonstrate that vitamin B<sub>6</sub> status indices are lower during pregnancy without differences in the urinary excretion of 4-pyridoxic acid.

- Bioelectrical Impedance Spectroscopy (BIS) for Monitoring Changes in Fluid Volume During Pregnancy

Changes in body composition reflect changes in nutritional status and, oftentimes, health status. Body composition measurements may be affected by changes in the body's total water volume, specifically the extracellular fluid volume, and give erroneous results. In healthy individuals,



these two fluid compartments are tightly controlled; however, in cases of nutritional compromise or ill health, extracellular fluid will disproportionally increase the total body water volume. It is important, therefore, to monitor changes in extracellular fluid volume and the total body water.

Researchers at the Western Human Nutrition Research Center, University of California, Berkeley, and the Children's Nutrition Research Center used the BIS technique to noninvasively measure changes in these fluid volumes of women before, during, and after pregnancy. Results from the BIS technique were compared to laboratory isotope tracer methods and found to give equivalent results. Mean differences between the BIS and isotope tracer techniques, from prepregnancy through the postpartum measurements was only 1.3 L for extracellular fluid and 1.2 L for total body water. This procedure shows great promise as a new technique for the quick, accurate, and noninvasive assessment of body fluid changes and, thus, nutritional and health status.

#### 4. Adult Nutrition

- Moderate Alcohol Consumption Linked to Hormone Changes in Women

One of the key ways that diet affects the risk of developing breast cancer is by changing the exposure of breast tissue to estrogen and other hormones. Several dietary factors have been shown to affect blood estrogen levels. The potential role of alcohol consumption has been a prominent consideration in the etiology of breast cancer and is particularly important because it is a risk factor that can be modified. Studies by the Lipid Nutrition Laboratory at the Beltsville Human Nutrition Research Center have shown that moderate alcohol consumption increased estrogen and other hormone levels in premenopausal women consuming a controlled diet. Increases in hormones occurred in various phases of the menstrual cycle but were especially prominent around the time of ovulation. Thus, increased risk of breast cancer due to moderate alcohol consumption may be related to increased exposure of breast tissue to estrogen.

#### 5. The Elderly

- Folate, Vitamin B<sub>12</sub>, and Vitamin B<sub>6</sub> Status Are Associated with Plasma Homocysteine in Older Americans

Recent studies have demonstrated associations between some cardiovascular and neuropsychiatric diseases and elevated levels of homocysteine, a nonprotein-forming amino acid. While some cases of hyperhomocysteinemia may have a genetic basis, some data have indicated this condition may be attributed primarily to nutritional status. Scientists at the USDA Human Nutrition Research Center

on Aging at Tufts University examined survivors ages 67-96 years from the original Framingham Heart Study population. They found that one-quarter of the people had higher than normal homocysteine levels and two-thirds of those could be attributed to low or marginal status of folate, vitamin B<sub>12</sub>, or vitamin B<sub>6</sub>, or all three. A strong case can now be made for the prevention of marginal deficiencies of these vitamins, common among older people, as the deficits may be linked to the risk of cardiovascular disease, the leading cause of death in this population.

- Long-Term Care for the Elderly

Despite the tremendous amounts of money being allocated to long-term care, the needs of all elderly Americans are not being met. The present system of providing and paying for long-term care is fragmented and confusing. The Family Economics Research Group in Beltsville, MD, analyzed data and concluded that over 8 million elderly Americans will need some type of long-term care by the year 2000. To help with these needs, numerous public programs, particularly Medicaid and Medicare, have been developed and expanded. Public programs paid for 50 percent of nursing home care and 74 percent of home health care in 1990. The recent availability of long-term care insurance policies through private companies has not yet had a big effect on long-term care, since only 3 percent of the elderly had policies by late 1991. The United States does not have adequate mechanisms for helping families anticipate and pay for long-term care. Greater awareness of the various community services available to the elderly is needed.

#### 6. Nutrient Functions

- Human Zinc Requirement Estimated by Erythrocyte Metallothionein

Researchers in Florida estimated the zinc requirement based on a new method of repletion response of erythrocyte metallothionein. The amount of zinc required to restore erythrocyte metallothionein to the predepletion quantity was evaluated in human subjects in a controlled metabolic protocol, including standard indices of zinc status. Fifteen male subjects participated in a 90-day, 4-phase study consisting of acclimation, treatment, depletion, and supplementation (additional 50 mg zinc/day). During the treatment phase, erythrocyte metallothionein decreased in the group fed 3.2 mg zinc/day. Erythrocyte metallothionein decreased during the depletion phase (46 percent) to below the normal value in all groups and increased in the supplementation phase. Plasma zinc concentration decreased in the group fed 3.2 mg zinc/day during the treatment phase relative to the acclimation phase. Erythrocyte zinc decreased in all groups during the depletion phase relative to the treatment phase and then increased during the supplementation phase. These data suggest that erythrocyte metallothionein can be used as a measure of status in severe

zinc depletion and that comparing the change in erythrocyte metallothionein over a 6-week period can differentiate between low and adequate levels of dietary zinc intake. The results point to a direct regulation of a human gene (metallothionein) through a dietary component. This represents an example of a nutrient-gene interaction.

- Zinc Deficiency Alters Vitamin A Transport

There is a possible biochemical and physiological link between zinc deficiency and the clinical symptoms of vitamin A deficiency, such as night blindness or impaired adaptation to the dark. Studies conducted at Kansas State University show that the lymphatic absorption of vitamin A is impaired in zinc-deficient rats. This is related to a biochemical defect in producing chylomicrons, which are the principal carriers of dietary vitamin A into the blood. The defect stems from the failure of the intestinal cell to incorporate vitamin A into chylomicrons. This problem appears to be caused by the inability of the liver to secrete adequate amounts of phosphatidylcholine (lecithin) in zinc deficiency. Intestinal infusion of phosphatidylcholine, along with vitamin A, restores the intestinal absorption of the vitamin. Findings unveiled for the first time the exact mechanism underlying the alterations in vitamin A metabolism as produced by zinc deficiency. The data also may explain why the body status of the vitamin is low in zinc-deficient individuals and why the clinical symptoms of vitamin A deficiency are manifested in zinc deficiency. The information gained will help devise new approaches for correcting the clinical symptoms of vitamin A deficiency, which is prevalent in premature infants, the elderly, and malnourished children.

- Metabolism and Function of Vitamin A in Quail Embryogenesis

One focus of research at Michigan State University is to elucidate the function of vitamin A in early development. An aspect of this research tested the hypothesis that the vitamin A deficiency-associated lethal syndrome observed in avian embryos may be linked to dysfunction of vitamin A-dependent genes. Researchers examined the expression of retinoic acid receptors (RAR's), cytosolic retinoic acid binding protein (CRABP), and Msx-1 (a homeobox gene known to be affected by retinoic acid [RA]), in vitamin A-sufficient and vitamin A-deficient quail embryos during early development. The expression of RAR-alpha and RAR-gamma remained constant during early development, while that of RAR-beta and CRABP were found to be developmentally regulated. Msx-1, in contrast, was significantly reduced in the presence of vitamin A, but overexpressed in vitamin A deficiency.

In another project, researchers tested the hypothesis that avian cardiovascular development is vitamin A-dependent, and that RA is active in this event. A monoclonal antibody

(MoAb) against RA blocked normal embryonic development causing cardiovascular abnormalities typical of avian vitamin A deficiency. The MoAb was localized in Hensen's node, caudal area, heart-forming areas, and head mesenchyme. These studies are the first to localize endogenous RA during early stages of normal avian development. Researchers concluded that RA or a closely related metabolite is the physiological form of vitamin A required for normal cardiovascular development and other early developmental events in the quail embryo. They proposed that vitamin A status regulates the expression of RAR-beta during early embryogenesis and that RAR-beta plays a key role in the mechanism of action of vitamin A in early avian development.

In a companion project, researchers challenged the hypothesis that RA is a morphogen in chick limb-bud duplication by grafting vitamin A-deficient organizer tissue onto developing chick limb bud. Results suggested that RA is not a direct morphogen, nor is it involved in the expression of Shh, a gene involved in axis patterning in the chick limb bud.

- Identification of an Indicator of Copper Status

Inadequate copper status is suspected to contribute to the occurrence of ischemic heart disease in humans. Confirmation of this suspected relationship has been constrained by the lack of a method to discriminate between adequate and inadequate copper status. Scientists at the Grand Forks Human Nutrition Research Center discovered that the copper-dependent enzyme cytochrome C oxidase in platelets (a cell found in blood) is a sensitive indicator of copper status. The activity of this enzyme, which is involved in the body's use of oxygen, is significantly depressed in platelets of experimental animals with marginal copper deprivation and in platelets of experimental animals and humans with marginal copper deprivation. The use of this indicator should help establish whether an inadequate intake of dietary copper is a major contributor to ischemic heart disease and thus show that copper is an important practical nutritional concern.

- "Conditionally Essential" Amino Acids in Humans

Traditional classification of amino acids as "essential" and "nonessential" should be reconsidered. Tyrosine, cysteine, glycine, proline, and arginine might be reclassified as "conditionally essential." All five require preformed amino acid skeletons. Using gas chromatography-mass spectrometry, scientists at the Children's Nutrition Research Center examined, in fed and fasted humans, the kinetics of plasma lysine, glutamate-glutamine, arginine, and proline following the oral administration of a mixture of uniformly (U)-<sup>13</sup>C-labeled protein and carbohydrate. Measurement of the appearance of products in plasma allows the sensitive detection of amino acid biosynthesis. The labeling pattern



of arginine and proline suggested synthesis from both intestinal and systemic glutamate. However, while arginine synthesis was readily measurable in fed and fasted states, significant proline synthesis occurred only in fasted subjects. Proline and arginine are "conditionally essential" for omnivores and may be nutritionally indispensable for traumatized, burned, or postsurgical patients. Excess arginine is vital in removal of excess ammonium ions. Arginine is the indispensable precursor of creatinine in the kidney. Availability of arginine may affect blood pressure and higher cognitive function.

- Copper Deficiency Impairs the Ability To Dissolve Blood Clots

Thrombosis, or the presence of a blood clot blocking a blood vessel or formed in a heart cavity, is a contributing factor to coronary heart disease. Blood clots in other critical organs also can cause death or other pathological consequences. Researchers at the Grand Forks Human Nutrition Research Center found that copper-deficient mice have an impaired ability to dissolve blood clots. This finding suggests that inadequate copper nutrition can contribute to the development of thrombotic lesions associated with coronary heart disease and is further evidence that consuming a diet adequate in copper is helpful for maintaining healthy hearts and blood vessels and in preventing clotting disorders.

- Plant Sources in the U.S. Diet Provide 75-85 Percent of Needed Omega-3 Fatty Acids

Linoleic and linolenic acids are the predominate polyunsaturated fats in the U.S. diet. Results from animal studies conducted at the ARS National Center for Agricultural Utilization Research, Peoria, IL, indicated that a balance between these omega-6 and omega-3 essential fatty acids in dietary fats is crucial to good health. The problems were (1) how to decide if animal data accurately reflect the metabolism of these fatty acids in human subjects; (2) how to conclude if the ratio or the amount of these fats in the diet controls the balance; and (3) how to determine if a normal U.S. diet contains sufficient omega-3 fatty acids to meet estimated requirements.

To answer these questions, human subjects were placed on diets containing different amounts of polyunsaturated fats for 2 weeks, and then the metabolism of linolenic and linoleic acid was followed by feeding stable-isotope-labeled analogues of each fatty acid. The results indicate that animal data are only a partial substitute for human data; that the amounts of the omega-3 and omega-6 fatty acids in the diet are more important than the ratios; and that the amount of linolenic acid in the U.S. diet provides 75-85 percent of the omega-3 fatty acids estimated to be needed in adult diets. The rest of the needed omega-3 fatty acids are very-long-chain (22-20 carbon) fatty acids from meat and fish.

- Activity of the Hypothalamic-Pituitary-Adrenal Axis Is Elevated in Rats with Activity-Based Anorexia

Activity-based anorexia in rats is characterized by suppressed food intake and excessive physical activity. These behaviors are typical of people with anorexia nervosa. Activity of the hypothalamic-pituitary-adrenal axis is known to be elevated in anorexia nervosa. Researchers in Georgia investigated the status of this axis in activity-based anorexia. Meal-fed control (MFC) rats and meal-fed wheel-running (MFWR) rats were given access to food for 90 minutes daily; MFWR rats were allowed access to an activity wheel for the remainder of the day. The experiment terminated when MFWR rats reached 75 percent of preexperimental body weight (3.9 days for males and 4.2 days for females). Male and female MFWR rats consumed less food than MFC rats, while maintaining a high level of wheel running. Corticosterone concentrations were significantly elevated in MFWR rats. Corticotropin-releasing hormone mRNA concentrations in the paraventricular nucleus were not different. Relative adrenal gland weights were greater and thymus gland weights were lower in MFWR rats. Changes in food intake could not be explained by differences in insulin, glucose, ketone bodies, or norepinephrine concentrations. Results suggest increased activity of the hypothalamic-pituitary-adrenal axis in activity-based anorexia.

- Dietary-Induced Anorexia: Involvement of the Histaminergic System

Research conducted in Kentucky was designed to examine relationships between diet composition, central nervous system histaminergic receptors ( $H_1$ ), and food intake in rats. Groups of rats were freely fed either a normal protein diet, a low-protein diet, or pair-fed a diet of normal protein content. Compared with rats fed a normal protein diet, rats fed low-protein or food-restricted diets had increased specific whole-brain [ $^3H$ ]-mepyramine binding, suggesting elevated  $H_1$  receptor concentrations. Significant ultradian bioperiodicities in  $H_1$  receptors were identified in all dietary groups. Ultradian parameters of  $H_1$  receptors were altered by low-protein and pair-fed diets. This study suggests that either increased histamine or  $H_1$  receptor concentrations are potential mechanisms for elevated central histaminergic activity in states of dietary stress, such as those observed in anorexia nervosa.

- Bifidobacteria in Dairy Products and Colon Health

Foods that contain lactic acid bacteria have a reputation for being healthful. As a result, many dairy products now contain added *Bifidobacterium* spp. and *Lactobacillus acidophilus*, even with no clear scientific evidence of specific health benefits. Researchers in Minnesota studied the effects of addition of bifidobacteria and lactobacilli to milk on colonic *Clostridium perfringens* (a potential pathogen) and the development of colonic aberrant crypts

(precancerous lesions that indicate a risk of colon cancer) in rats.

In two out of three studies, consumption of bifidobacteria in milk and fructose oligosaccharide decreased the incidence of aberrant crypt development. Aberrant crypts were not decreased by bifidobacteria alone or fructose oligosaccharide alone. In vivo and in vitro studies showed that bifidobacteria can decrease the numbers of *Clostridium perfringens* under various, but not all, conditions. When *Lactobacillus acidophilus* was added to bifidobacteria and given to rats in vivo, the numbers of *Clostridium perfringens* were reduced. Because the in vivo results were not always consistent, they characterized the physiology and stability of commercial cultures of bifidobacteria in various dairy products and enumerated both bifidobacteria and lactobacillus in these cultures. Although an enzyme assay for fructose-6-phosphoketolase was found to be diagnostic, it is sometimes difficult to interpret. Most commercial products contained stable cultures of bifidobacteria over their normal shelf life.

- Dietary Management of Lactose Intolerance

Lactose intolerance is a significant problem for about 25 percent of the U.S. population and can limit calcium consumption, which is already well below recommended levels in the U.S. diet. Researchers at the University of Minnesota discovered that yogurt bacteria contain a significant amount of natural "lactase" that aids in the digestion of lactose in the intestine. Hence, yogurt is well tolerated by lactose-intolerant persons. Strains of yogurt bacteria are being selected, which will maximize the ability of yogurt to assist with lactose digestion. Related work on lactose digestion has shown that lactose-intolerant persons can improve their tolerance by frequently consuming small amounts of lactose. The colon bacteria adapt to this lactose consumption to improve the fermentation of lactose, thus reducing symptoms. Consuming dairy foods with meals also dramatically improves tolerance.

## **C. Role of Nutrition in Promoting Health and Preventing Diet-Related Disorders**

### **1. Body Composition**

- Genetic Diversity in Patterns of Fat Deposition in Humans

The amount and distribution of body fat, especially abdominal visceral fat, is a significant factor in health maintenance. Of major concern is the effect of weight reduction programs on the site of fat loss and the resulting effect on body composition. Scientists at the Beltsville Human Nutrition Research Center found significant differences in the amount of visceral adipose tissue in black and white women but no differences between binge and nonbinge eaters. Use of

computerized tomography to quantitate the total amount of fat, as well as the distribution of fat in the body, allowed the scientists to follow changes in fat distribution during a 6-month weight reduction study. The results may explain the differences in morbidity and mortality between black and white women and are of particular benefit to African-American women.

### **2. Dietary Lipids**

- Oxidative Susceptibility and Improving Vascular Health with Dietary Fish Oil

Research at Oregon State University centered on the role of dietary fat, especially fats derived from fish, on human health. In a metabolic feeding study involving 21 healthy young men, the investigators found that the consumption of fatty species of fish (for example, chinook salmon and black cod) resulted in an increase in plasma LDL-C (low-density lipoprotein cholesterol) but a decrease in triglycerides. This dietary intake also improved bleeding time, platelet aggregation, and prostaglandin production. The consumption of low-fat fish did not cause significant changes in these indices. This study suggests that the benefit to eating fish derives more from its influence on hemostasis than its influence on plasma lipid values.

Another study was conducted to address the concern that the consumption of highly unsaturated fish fatty acids may increase peroxidation of LDL. Researchers gave 48 postmenopausal women 15 g of fish oil supplements daily and 4 doses of vitamin E (0-400 IU's) during the course of a 9-month crossover trial to determine if increased peroxidation could be prevented with increased dietary E. They found that fish oil increased LDL oxidative susceptibility, as measured by a shortened lag time, and that the largest dose of vitamin E was required to return the lag time to baseline values. Surprisingly, however, once the LDL particles were depleted of their antioxidants, the rate of production of conjugated dienes was slower in the fish-oil-rich LDL particle. This suggests that consumption of fish oil may provide some degree of protection from oxidation to the LDL particle.

- Regulation of Fatty Acid Traffic in Intestinal Cells

It has been known for over 20 years that intestinal epithelial cells contain high levels of two related, but distinct, fatty acid binding proteins (FABP's), called I-FABP and L-FABP (the former is found only in the intestine, the latter is also found in the liver). The precise functions of these proteins are not known, nor is it known why epithelial cells contain two separate FABP's. Using purified I-FABP and L-FABP, researchers at Rutgers University identified large differences in the mechanism by which these two proteins transport fatty acids to membranes. Although both FABP's bind fatty acids similarly, the rate of transport of the fatty



acid to a membrane acceptor is two to five times faster for the I-FABP than the L-FABP. Moreover, transfer of fatty acids from I-FABP appears to occur during direct collisional interaction of the protein with the membrane, whereas transfer of fatty acid from L-FABP occurs by dissociation of the fatty acid and diffusion through the aqueous phase to the acceptor membrane. These results suggest two very different functions for these related proteins. L-FABP may serve as a reservoir for fatty acids in the intestinal cell, providing precursors for triglyceride synthesis and preventing the potentially toxic buildup of unbound fatty acids. I-FABP, on the other hand, may serve a more specific role in the targeted delivery of fatty acids to sites of metabolic utilization on membranes.

- Dietary Gamma-Linolenic Acid Inhibits Macrophage and Smooth Muscle Cell Interaction

Vascular smooth muscle cells (SMC's) and macrophages are major reactive cell types in atherosclerosis. Researchers in Texas recently developed a coculture system for studying the interactions between these cell types. Since SMC proliferation is a key event in the development of atherosclerotic lesions, they determined how dietary oils containing gamma-linolenic acid (GLA), primrose oil, and long-chain n-3 fatty acids (fish oil) influence the ability of macrophages to modulate SMC DNA synthesis in vitro. Mice were fed one of four diets containing 10 percent corn oil (CO), primrose oil (PO), fish-corn oil mix (FC), or fish-primrose oil mix (FP) for 2 weeks. Peritoneal macrophages were isolated and seeded in the upper chamber on tissue culture inserts consisting of a semipermeable membrane. Macrophages were preincubated with or without indomethacin (cyclooxygenase inhibitor) or L655,238 (5-lipoxygenase inhibitor), and subsequently cocultured with naive aortic SMC's growing in the lower chamber on culture dishes in the presence of [3H]-thymidine. [3H]-thymidine incorporation into SMC's and prostaglandin synthesis by SMC's were measured at the end of the incubation period. SMC DNA synthesis was inhibited by 28 and 60 percent in PO and FP diets containing 10.1 and 8.2 percent gamma-linolenic acid, respectively, relative to the control CO diet. Synthesis of PGE1, a potent antiproliferative GLA-derived eicosanoid produced by macrophages and SMC's was four times greater in PO and FP groups than the control CO group. Macrophage inhibition of SMC DNA synthesis was abolished by preincubation with indomethacin, but not L655,238. These data indicate that dietary oils containing gamma-linolenic acid can reduce macrophage-directed SMC DNA synthesis in a cyclooxygenase-dependent manner and therefore may favorably modulate the atherogenic process.

- Trans Fatty Acids No Worse Than Saturated Fatty Acids in Effects on Blood Lipids

Processing vegetable oils involves partial hydrogenation, a chemical process that leads to the formation of trans fatty acids, which may carry a cardiovascular disease risk. In a

study at the Beltsville Human Nutrition Research Center, trans fatty acids caused elevations of total plasma and LDL-cholesterol ("bad cholesterol") similar to, but no greater than, those from a diet with equally high levels of saturated fatty acids. At levels of trans intake equal to the average intake in the U.S. diet, there were only minor effects on HDL-cholesterol (high-density lipoprotein cholesterol, also known as "good cholesterol"), compared with a highly desirable diet having high levels of naturally occurring unsaturated fatty acids. Thus, partially hydrogenated vegetable oils may continue to be consumed in moderation as part of a healthy, fat-controlled diet. Results of this study are important to consumers, farmers, and manufacturers in the oilseed industry who want to produce healthy foods.

- Oils Rich in Polyunsaturated or Monounsaturated Fatty Acids Can Be Substituted for Saturated Fatty Acids as Part of a Cholesterol-Lowering Diet

While recommendations for heart-healthy diets include a reduction in saturated fat and cholesterol intake, there is still debate whether the remaining fat in the diet should be relatively high in monounsaturated or polyunsaturated fatty acids. Researchers at the USDA Human Nutrition Research Center on Aging at Tufts University examined this issue by testing 15 middle-aged and older adults with high LDL-C concentrations under strictly controlled conditions. The subjects received low-fat diets in which two-thirds of the fat calories were given as canola, corn, or olive oil in a randomized, double-blind fashion for 32 days each. Plasma cholesterol and LDL-C levels declined in each group, but the change was greater with canola-oil and corn-oil diets. Although differential effects were seen after the consumption of these three oils in some plasma lipid measures, none of these oils had a significant advantage in altering the overall lipoprotein profile. These data are consistent with dietary recommendations for modestly hypercholesterolemic middle-aged and older people that call for reducing LDL-C by 15 percent, compared with the average U.S. diet, and that allow substitution of oils rich in polyunsaturated or monounsaturated fatty acids for saturated fatty acids when there is sufficient linoleic acid.

### 3. Dietary Fiber and Carbohydrates

- Simplified Measurement of Total Dietary Fiber in Fruits and Vegetables

Dietary fiber, especially in fruits and vegetables, may reduce the risk of cardiovascular disease and certain cancers. To learn more about the role of dietary fiber in the prevention of disease, data on the fiber content of foods must be easy to measure, as well as accurate and precise. Scientists at the Beltsville Human Nutrition Research Center developed simplified procedures for measuring total dietary fiber in fruits and vegetables.

Measurement of dietary fiber in most foods requires several tedious and laborious steps to first remove such components as starch and protein. Because many vegetables and most fruits contain little or no starch, steps to remove starch were eliminated from the fiber determination. The resulting method is shorter and cheaper and produces less hazardous chemicals. This methodology will be very useful to commercial analytical laboratories, as well as laboratories of food companies as part of fulfilling the requirements of the Nutrition Labeling and Education Act and generating data on the dietary fiber content of fruits and vegetables for use by the diet and health community.

#### 4. Vitamins and Minerals

- Differences in Calcium Metabolism May Reveal Why African Americans Have Higher Bone Mass than Whites

Studies reveal that African Americans and Mexican Americans have greater bone mass and less osteoporosis than European Americans. Investigators at the USDA Human Nutrition Research Center on Aging at Tufts University examined healthy women and compared their fractional calcium retention and production of the calcium-regulating hormones, 1,25-dihydroxyvitamin D and parathyroid hormone, during periods of high and low calcium intakes. African Americans had higher levels of vitamin D than did European Americans on both diets and a greater increase after calcium restriction. These findings raise the possibility that African Americans have lower excretion of vitamin D, which may account for their higher levels of the vitamin and more favorable bone status. This information could prove important to establishing the dietary requirements for calcium and vitamin D in older adults.

- Stearic Acid Promotes Iron Utilization

Meat contains a factor that promotes iron absorption and utilization in humans. Identification of this factor would be helpful for alleviating iron deficiency, a significant nutritional problem worldwide. Researchers at the Grand Forks Human Nutrition Research Center obtained evidence that stearic acid—a fatty acid found in meat, especially beef—is such a meat factor. When compared to safflower oil, stearic acid added to the diet of iron-deficient dogs doubled radioiron absorption and significantly increased the movement of iron into the blood and the production of red blood cells. Thus, not only does red meat supply iron, it contains a substance that enhances iron utilization by the body.

- Dietary Folic Acid Intake Needed To Reduce the Risk of Heart Disease

Individuals with abnormally high levels of blood homocysteine, a naturally occurring amino acid, are at increased risk for developing heart disease. High levels of homocysteine

can occur from a diet deficient in folic acid, a B vitamin found in green vegetables and some fruits. Scientists at the Western Human Nutrition Research Center in San Francisco and at the UCLA School of Public Health conducted a controlled study in which dietary folate equivalent to 12 percent, 100 percent, and 220 percent of the current Recommended Dietary Allowance (RDA) were fed to 10 healthy men to determine the folate intake that would prevent elevated homocysteine. Nearly half of the men developed high homocysteine levels after 4 weeks of low folate intake. Some high levels persisted even after 2 weeks of 100 percent RDA intake, but all decreased to normal within 9 days when the high intake diet was fed. The results indicate that the current RDA for folic acid may not be sufficient to prevent elevated homocysteine levels.

- Low Dietary Carotene Increases Oxidative Damage

Eating foods high in carotenes (such as carrots, squash, and tomatoes) is associated with reduced risk of getting certain cancers. Scientists speculate that carotenes might protect us from cancers by preventing oxidative damage, but the only established role of carotenes in humans is to serve as sources of vitamin A. Scientists at the Western Human Nutrition Research Center completed a study in which a diet low in carotenes (but with adequate vitamin A) was fed to healthy adult women for 10 weeks, followed by the same diet with added carotenes for 4 weeks. Oxidative damage increased while the women were fed the low carotene diet, then decreased after they were given carotenes. These results suggest that carotenes may form an important part of the antioxidant defense system which protects against oxidative damage, a known risk factor for cancer.

#### D. Food Composition and Nutrient Bioavailability

- Improved In Vitro Method for Assessing Iron Bioavailability

Iron deficiency anemia is generally considered the most widespread nutritional deficiency in the United States. This is due, in part, to the fact that only 5-10 percent of dietary iron is bioavailable (available for absorption and utilization). Improving iron bioavailability has been hampered by poor understanding of the factors regulating iron absorption. Scientists at the U.S. Plant, Soil, and Nutrition Laboratory in Ithaca, NY, developed a system for estimating bioavailability. The system involves simulated digestion of a food or a meal, followed by measurement of iron uptake by intestinal epithelial cells grown in single-layer cell cultures. This model should prove useful in improving understanding of the factors that limit iron bioavailability. It could also provide an inexpensive means of screening foods and meals for iron bioavailability. Improved knowledge of the factors limiting bioavailability and an inexpensive screening method would contribute to a reduction in the incidence of iron deficiency anemia.



- Urinary Conjugates in Adult Males and the Effect of Dietary Broccoli

The effects of dietary broccoli on the body's ability to detoxify were studied by researchers in Virginia in 18 adult males by measuring the major urinary conjugation products—mercapturates, sulfoconjugates, glucuronides, and amino acid conjugates. After several days of consuming a semisynthetic diet to establish baseline endogenous levels, subjects continued receiving the semisynthetic diet with added broccoli at 250 g/day for 3 days followed by 500 g/day for another 3 days. A significant increase in urinary mercapturates and sulfoconjugates was observed with added broccoli, but no significant influence was noted for glucuronides or amino acid conjugates. A significant linear trend for mercapturate excretion was dose dependent. Although an unexplained decrease in sulfoconjugates was observed the first day of consuming broccoli, within the 6-day dietary broccoli treatment, a continuous increase was noted. The sulfoconjugate excretion did not appear to be dose dependent. Overall, of the four detoxification pathways studied, the level of urinary mercapturates is the most responsive to dietary broccoli and, consequently, mercapturate excretion would appear to more closely reflect exogenous, rather than endogenous compounds. Thus, mercapturates appear to be a better indicator of the effect of dietary broccoli than the other pathways (conjugates) studied, despite the fact that the actual amount of excretion was one-tenth that of the other pathways.

## E. Food and Nutrition Monitoring Research

### 1. U.S. Food and Nutrient Supplies

- U.S. Food Supply: Food Disappearance

Economic Research Service (ERS) annually calculates the amount of food available for human consumption in the United States. The U.S. food supply series (Food Consumption, Prices, and Expenditures, 1970–1993) measures national aggregate consumption of several hundred basic commodities. It is the only continuous source of data on food and nutrient availability in the country.

The food supply series is based on records of commodity flows from production to end uses. The total available supply is the sum of production, beginning inventories, and imports. These three components are either directly measurable or are estimated by government agencies using sampling and statistical methods.

The food available for human use is what is left from available supply after deducting exports, industrial uses, farm inputs, and end-of-the-year inventories. Human food use is not directly measured or statistically estimated. Instead, it is a residual component after subtracting other uses.

The availability of food for human use represents disappearance of food into the marketing system; it is often referred to as food disappearance. Food disappearance measures food supplies for consumption through all outlets—at home and away from home. Per capita food use, or consumption, is calculated by dividing total annual food disappearance by the total population.

Food disappearance is often used as a proxy to estimate human consumption. Used this way, the data usually provide an upper-level limit on the amount of food available for consumption. In general, food disappearance data indicate trends in consumption over time, rather than absolute levels of food eaten. Food disappearance estimates can overstate actual consumption because they include amounts that may not be used due to spoilage and waste accumulated through the marketing system and in the home.

Here are some highlights of changes in per capita food supplies between 1970 and 1993. Americans consumed less red meat and more poultry and fish in 1993 than in 1970. Red meat accounted for 60 percent of the total meat supply in 1993, compared with 70 percent in 1980 and 74 percent in 1970. Chicken and turkey accounted for 32 percent of the total meat consumed in 1993, up from 23 percent in 1980 and 19 percent in 1970. In 1993, per capita consumption averaged 19.8 pounds less red meat, 27.3 pounds more poultry, and 3.2 pounds more fish and shellfish than in 1970.

There is a trend toward lower fat milk. Between 1980 and 1993, Americans cut their average annual consumption of fluid whole milk by nearly half, increased use of low-fat milk by two-fifths, and more than doubled their consumption of skim milk. But the nation failed to cut its overall use of milkfat because of the growing demand for cheese. Per capita use of cheese increased 50 percent since 1980.

Americans increased their consumption of fruits and vegetables roughly 13 percent between 1980 and 1993. On a farm-weight basis, vegetables accounted for most of the increase. Consumers bought more fresh produce, frozen and dried fruit and vegetables, fruit juices, and canned tomatoes, and less canned fruit and canned vegetables other than tomatoes.

Consumption of grain products has risen in recent years, but remains well below consumption levels in the early part of the century. In 1993, per capita use of flour and cereal products was 189 pounds, 44 pounds above the 1980 level but more than 100 pounds below the 1909 level. The recent expansion in supplies reflects ample grain stocks and strong consumer demand. Much of this growth was product-driven, as (1) consumers gained appreciation for a variety of breads, (2) fast-food sales of hamburgers and other products made with buns expanded rapidly, and (3) in-store bakeries and baking spurred sales.



Americans have become conspicuous consumers of sugar, sweet-tasting foods, and beverages. Total per capita use of caloric sweeteners, on a dry-weight basis, rose 18 percent between 1980 and 1993. In 1993, Americans consumed, on average, a record 147 pounds of caloric sweeteners, compared with 124 pounds in 1980. A striking change in the availability of specific sugars has occurred in the past decade. Sucrose accounted for 44 percent of the total caloric sweetener supply in 1993, on a dry-weight basis, compared with 67 percent in 1980. By 1993, corn sweeteners accounted for 55 percent of the total caloric sweeteners consumed, up from 32 percent in 1980.

For more complete information on the food supply series, see *Food Consumption, Prices, and Expenditures, 1970-93* (ERS, SB-915, December 1994). ERS also published a two-part series that used U.S. per capita food supply data to gauge how our eating patterns are changing over time. The focus in the first article was animal products; see "American Eating Patterns Changing: Part I: Meat, Dairy, and Fats and Oils" by Judith Jones Putnam in *FoodReview* (ERS, September-December 1993, pp. 2-11). A second article covered crop products; see "American Eating Patterns Changing: Part 2: Grains, Vegetables, Fruit, and Sugars" by Judith Jones Putnam in *FoodReview* (ERS, May-August 1994, pp. 36-48).

- Nutrient Content of the U.S. Food Supply

Food supply determinations are one of the five major components of the National Nutrition Monitoring and Related Research Program. ERS determines the amounts of food available for consumption annually in the United States. Foods are at a preprocessed or commodity level when per capita use is determined. ARS estimates amounts available for consumption per day for food energy and 24 nutrients and food components. Estimates of the nutrient content of the food supply are derived by using data on quantities of foods available for consumption and data on the nutrient composition of foods. Nutrient levels represent what is available for consumption. The nutrient content of the U.S. food supply series dates continuously from 1909. A departmental report, "Nutrient Content of the U.S. Food Supply, 1909-1990" (HERR No. 52), was published in 1994. This revision includes revised estimates for the years 1909-88, as well as new estimates for 1989 and 1990. Substantial change has occurred in the U.S. food supply during this century, both in the quantities of food available from selected food groups and the nutrients available from these groups. Additionally, these estimates reflect the development or revision of methodologies, the incorporation of more recent food composition data, and the release of updated data on food use. U.S. food supply nutrient data for 1970-90 were placed on the USDA-ARS electronic bulletin board.

- Food Supply Methodology Changes and Improvements

Several improvements were made in the food supply methodology to better reflect market conditions and technological advances. Revisions are ongoing to update estimation of nutrients added to the food supply in fortification and enrichment.

Because of the emphasis on fruit and vegetable consumption in the Food Guide Pyramid and the need to continue monitoring fresh vegetable and fruit consumption, Center for Nutrition Policy and Promotion (CNPP) staff used data generated by ERS specialists to fill some vegetable data voids for 1982-91. During these years, USDA stopped reporting per capita values for many fresh vegetables because production data were not available on a national level. Based on updated ERS data, per capita estimates were reinstated for cabbage, green peppers, cucumbers, green beans, cantaloupes, artichokes, eggplant, garlic, and watermelons. The nutrient per capita values based on these new estimates are more accurate than previous values.

To ensure consistent data between CNPP and ERS on fluid milk products, per capita estimates for whole, low-fat, and skim milks, as well as yogurt and creams, were revised. These estimates reflect adjustments made due to changes in population estimates (1990 census) and in the percentage of butterfat content over time.

## 2. Food Consumption Surveys

- Ten-Year Comprehensive Plan for Nutrition Monitoring and Related Research

The National Nutrition Monitoring and Related Research Act of 1990 required the Federal Government to develop a 10-year comprehensive plan for nutrition monitoring and related research. As required by law, the plan was transmitted by the President to Congress, and was published in the *Federal Register* on June 11, 1993. The plan serves as the basis for planning and coordinating the activities of 21 Federal agencies responsible for nutrition monitoring and related research. The primary goals of the plan are to ensure that the agencies collect data that are continuous, timely, and reliable; coordinate data collection; use comparable methods for collecting data and reporting results; and conduct research on the issues and topics relevant to monitoring the nutrition and health status of the population and subgroups at nutritional risk.

The plan identifies nearly 70 activities to complement or expand nutrition monitoring and related research. A three-tiered system denoting Federal agency commitment for an activity as being either a lead, collaborating, or contributing organization is also identified. Staff from agencies assigned to an activity work together and, collectively, they form the

Ten-Year Plan Implementation Working Group, which meets twice a year. A yearly executive summary is prepared that summarizes annual progress on major activities. Progress documents have been prepared for 1992, 1993, and 1994. Yearly progress on the 10-year plan activities is also the focus of the end of the year meeting of the Interagency Board for Nutrition Monitoring and Related Research.

- Third Report on Nutrition Monitoring

Work proceeded on the development of the Third Report on Nutrition Monitoring, which was presented to Congress in 1995. This report was prepared by the Life Sciences Research Office of the Federation of American Societies for Experimental Biology, under contract with ARS. USDA-ARS and DHHS National Center for Health Statistics jointly serve as the coproject officers for the report. Data for the report were made available from 38 component surveys and surveillance systems of the National Nutrition Monitoring and Related Research Program (NNMRRP). Included is information available since the second report in the following areas—food supply; household-based food expenditures; food composition; food consumption; nutrition status and nutrition-related health measurements; and knowledge, attitudes, and behavior. The report also included an assessment of food components that represent public health issues in nutrition monitoring and recommendations for improvements in the NNMRRP.

- Assessment of Nutritional Risk in the Elderly in the Northeast

Because there are physiological changes associated with aging and because cognitive skills decrease with age, there is a need to modify and improve the nutritional status indicators and dietary intake survey instruments. Rapid and convenient, yet accurate, sensitive, and comprehensive screening tools are also important for early risk detection and follow-up.

A group of scientists in the Northeast examined the validity of methods of assessing food intake and factors affecting the food intake of older adults. The ability to remember the quantity of food eaten decreases with age, thus, errors in estimating portion size are greater than in a younger population. Researchers found that a methodology involving the frequency of food intake shows promise for assessing intake patterns, particularly for surveillance. Food groupings, social factors, and memory strategies are important integrative variables and continuous refinement will be required. The same researchers were the first to demonstrate that the types of food ingested were related to the level of olfactory function. Specifically, women with lower smell and flavor function had lower food interest, a lower preference for vitamins A- and C-rich fruits and vegetables, and pungent foods. They concluded that there is

a need to screen for the chemical senses when identifying older individuals for nutritional and medical risk.

The research group evaluated biochemical methods for determining protein, iron, magnesium, and vitamin D status of the elderly to complement the food surveys. Following are observations and results:

1. Insulin-like growth factor-1, and particularly its binding proteins, may be useful indicators of nutritional status and well-being.
2. For accurate assessment of an individual's iron status, most indices require one sample, whereas plasma transferring receptors require two, and serum iron about eight measurements.
3. A team made the first rapid and reliable estimates of true magnesium absorption using stable isotopes without fecal monitoring.

Individual assessments took less than 1 day. While the results are not complete, one early observation indicates that women in rural northern climates are at high risk for seasonal bone loss and eventual osteoporosis due to inadequate vitamin D intake and minimal exposure to sunlight.

- Factors Influencing Dietary Quality in Elderly Blacks

The population of elderly blacks is growing at a faster rate than elderly whites. Little is known, however, about the nutritional intake and factors that affect food intake in elderly blacks. A study conducted in Massachusetts describes the nutrient intake and density, as well as service use, sociodemographic and health factors, and their relationship to dietary quality in elderly blacks residing in Springfield's public housing. Subjects were interviewed in person, while a health and food habits questionnaire and 24-hour food recall were administered. Second and third food recalls were collected by telephone at about 1-month intervals. Subjects were single and predominantly of low income. Diets were, on average, very low in energy, calcium, and vitamin B<sub>6</sub>; slightly low in protein, thiamin, riboflavin, and iron; and adequate in niacin and vitamins A, C, and B<sub>12</sub>. However, the population as a whole consumed nutrient-dense diets. Men consumed more energy, fat, and cholesterol than women, with significantly lower intakes and nutrient density of vitamins C, B<sub>6</sub>, and thiamin. Dietary quality was related to gender, number of meals, use of home health aides, and past or present use of services. As a result of this study, the Western Massachusetts Food Bank designed a brown bag food distribution program for Springfield's elderly blacks to increase nutrients lacking in their diets. Springfield has also been targeted for increased food bank outreach activities.



- Factors Influencing Food Intake by Young Adults

Researchers working with adolescents showed that while the teens were developing very strong opinions about food, nutrition, body image, and health, their parents still had a great deal of control over their food intake. The researchers then addressed what happens to teens when they enter the transitional years of young adulthood (18-24 years). There is virtually no information about the effect of nutrition and health concerns on food intake by this consumer group. Focus group research has shown that 18 to 24 year olds feel pressed for time and concerned about food costs. Fast food is their staple because it is fast, cheap, familiar, and safe. At the same time, they worry about nutrition—mainly dietary fat, cholesterol, salt, and sugar, but also pesticides, additives, and other chemicals.

Based on findings from young adult focus groups, a mail survey was developed. It included a grid of factors that influence food choices and a food frequency questionnaire. Survey responses of 1,475 young adults across 10 States suggest that while health concerns are important, especially those relating to the caloric or fat content of food, habit has the greatest influence on food choice. Both young men and women perceive food in terms of its social context, appearance, their ability to purchase and prepare it, and cost. Young women also consider nutritional value and others' likes and dislikes. Young men also consider their habitual intake and convenience. The frequency of intake of several vegetable items related to perceptions of health, but habit was the primary predictor of selection. Low intakes of various nutrients were seen for both men and women. The findings suggest that education or advertising that promotes a wider variety of food for this age group may be most successful if it incorporates familiar convenience foods and stresses ways to reduce calories and fat.

- Food Consumption

The Nationwide Food Surveys conducted by ARS address the requirements of the National Nutrition Monitoring and Related Research Act of 1990. These surveys include the Continuing Survey of Food Intakes by Individuals (CSFII), the Diet and Health Knowledge Survey (DHKS), and the Household Food Consumption Survey (HFCS). During 1994, work continued on several different but concurrent surveys, each in a different stage of the survey process. Progress on the surveys is reported below:

- a. Survey Operations**

Data collection for the 1994-96 CSFII and the 1994-96 DHKS began in January 1994. Both surveys are being conducted by Westat, Inc., Rockville, MD, under contract to ARS. CSFII measures the kinds and amounts of foods eaten by Americans. The data are used to influence policy decisions for food assistance programs, food safety, food

labeling, food marketing, and health promotion. The target population consists of noninstitutionalized individuals of all ages in 50 States and the District of Columbia. About 15,000 individuals will provide 2 days of dietary intake data over the 3 years of the survey.

DHKS measures attitudes and knowledge about diet and health among Americans. The survey provides information for understanding factors that affect food choices and contributes information needed for developing and targeting nutrition education materials and programs. DHKS is conducted as a telephone follow-up to the CSFII so that data on food choices and nutrient intakes can be linked with information about dietary attitudes and knowledge. The target population is adults 20 years of age and older. About 4,500 individuals provide the data.

Both surveys are running smoothly and required response rates are being met. The contractor implemented automated field management and document tracking systems to monitor field operations and data processing. An ARS in-house tracking system monitors contractor work, verifies receipt of survey deliverables, and documents data flow within the agency. Survey data and status reports from the contractor of response rates and other key contractual requirements are received weekly through electronic transmissions. Review of the weekly transmissions by ARS and use of automated quality control facilitate the identification of problems and allow for early problem resolution. This approach has allowed ongoing data preparation by ARS and will expedite the public release of the CSFII 1994 data set.

- b. Survey Systems**

- Survey Net

Survey Net, a computerized system for on-line coding and entry of food intake data, was fully implemented with the beginning of the CSFII 1994-96. This system, developed by ARS under a cooperative agreement with the University of Texas, permits ARS to continually monitor the quality of the survey data as they are collected. Survey Net operates at the contractor's site, where food intake data are coded and entered, and at ARS. Features have been developed within this system to capture specific information about ingredients of food mixtures, such as type of milk or cooking fat used in recipes. Survey Net also links the food intake data to the Survey Nutrient Database for the purpose of calculating information on nutrient consumption. During the 3 years of the CSFII 1994-96, ARS expects to collect and process about 10,000 24-hour recalls per year. Survey Net is expediting this process and also increasing the control that ARS maintains over the survey contractor's performance.

A new system is under development to facilitate analysis of trends in nutrient intake data, which have been difficult to

assess in the past. This system will track changes to the nutrient database, separating real changes in foods from changes caused by improvements to the nutrient values. For foods that have actually changed over time, the database will include multiple entries. Dates attached to each entry will indicate the time period each set of values represents. The database will be used to recalculate nutrient intake data for USDA food consumption surveys back to 1985, so that comparisons from survey to survey can be based on comparable nutrient data.

- **Food Grouping System**

The Food Grouping System (FGS) facilitates the reporting of data on individual food sources, as separated from mixed food items from USDA's food consumption surveys. A main feature is one that enables the breaking out of specific food ingredients and the subsequent regrouping of information to the user's specifications. FGS also is able to report consumption according to agricultural commodities, and a preliminary linkage of USDA food codes to EPA's commodity codes in their Dietary Risk Evaluation System has been established. FGS is a critical component of a new method developed by ARS to monitor food intakes in terms of servings as defined by USDA's Food Guide (the basis for the Food Guide Pyramid). Initial results on servings of fruit and vegetable intakes were submitted for use in preparing the *Third Report on Nutrition Monitoring* and in providing the baseline for measuring progress toward meeting the Healthy People 2000 Nutrition Objectives.

- c. Survey Planning**

In collaboration with the National Center for Health Statistics, ARS is pursuing the development of a computer-assisted 24-hour recall dietary intake system that would be used in the CSFII and the National Health and Nutrition Examination Survey (NHANES). A meeting was held with scientists from academia to evaluate existing computer-assisted technologies for obtaining dietary intake data in national surveys and to determine what additional technologies are needed.

USDA and HHS cosponsored a workshop on dietary survey data requirements of Federal users. The workshop encouraged an exchange of information, enabling USDA and HHS to share information about current survey plans and constraints with users and enabling users to share their data requirements with survey planners.

Researchers at the Census Bureau's Center for Survey Methods Research began a second round of cognitive interviews designed to indicate where improvements in the 24-hour dietary recall procedures used in the CSFII can be made.

In preparing for the next Household Food Consumption Survey (HFCS), two projects were completed. In the first,

software application programs that will facilitate the ability to revise, update, and maintain the Household Food Code Database System were developed under contract. With many more new foods in the market since the last survey was conducted in 1987-88, the database of nearly 4,000 food codes must be updated. In the second project, some 30 Federal, academic, and other users of the HFCS data were contacted to provide recommendations for planning and designing the survey and disseminating survey data. These users strongly expressed the need for the HFCS, since it is the only national survey that provides information on the quantity of foods consumed by households, money value or expenditures, and nutrient availability from the household food supply. These are key variables in developing the USDA Food Plans and assessing the effectiveness of USDA food assistance programs. Many users also cited the need for more information on food eaten away from home, a larger sample size than that of the 1987-88 survey, and inclusion of attitudinal issues like those addressed in DHKS.

- d. Data Release**

Data tapes for the 1989-91 CSFII/DHKS were released in 1993. ARS is exploring alternative forms of releasing data to the public that will be faster and more user friendly. During 1994, work proceeded on development of a CD-ROM that contains all 3 years of CSFII/DHKS 1989-91 data. ARS acquired software from NCHS that provides a system for developing databases which can be distributed on CD-ROM for independent searching, tabulating, and exporting. The software, "The Statistical Export and Tabulation System," is a program that allows users to access documentation and data stored on CD-ROM and does not require a license fee, since it was produced by the government. The CD-ROM's will be available for about \$30 compared with \$350 for magnetic data tapes. The CD's can be used on a PC, while the magnetic data tapes require a mainframe computer.

Two statistical reports from the 1989-91 CSFII/DHKS were completed and sent forward for publication. They contain information on 1-day food and nutrient intakes and nutrition attitudes and dietary status of main meal planners-preparers. Release of data from the NFCS 1987-88 was completed with publication of a report on food consumption and dietary levels in U.S. households.

- e. Survey Results**

- **Servings Project**

The Servings Project, currently in development, will provide a method for monitoring how well Americans are meeting Food Guide Pyramid recommendations for servings from five major food groups. Databases were developed for assessing intakes reported in the 1989-91 CSFII. Manuscripts on intakes of fruits and vegetables, authored jointly



by researchers at the ARS and the National Cancer Institute, were submitted for publication in professional journals. Baseline data were provided for monitoring progress toward a Federal nutrition objective to increase the fruit and vegetable intake of adults to five or more servings per day by the year 2000. The average intake for adults was close to the target at four servings per day. However, more than two-thirds of men and three-fourths of women did not meet the objective.

- Fat Intakes by Individuals

Data from the CSFII 1989-91 indicated that Americans are obtaining 34-35 percent of their calories from fat. Although this rate is down considerably from the 1977-78 rate of 40 percent, it is still above the recommended 30 percent. Between 1977-78 and 1989-91, the contribution to fat intake from the meat, poultry, and fish group declined from 42 to 30 percent, while the contribution from grain products increased from 15 to 25 percent. The contribution of milk products remained about the same. Within the grain group, the major change was a decline in fat intake from cakes, cookies, and pies and an increase from grain mixtures. Grain mixtures include items such as pizza, spaghetti with sauce, macaroni and cheese, and tacos.

- Diet and Health Knowledge

A 1994 issue of *Food Review*, published by ERS, contained articles by ERS and ARS staff on results from the 1989-90 DHKS, namely "Diet-Health Awareness About Fat and Cholesterol—Only a Start," "Fiber: Not Enough of a Good Thing," and "Attitudes and Behaviors Related to Weight Status." Results showed that among main meal planners-preparers, diet-disease awareness was higher for cholesterol than for fat, fat intake was underestimated, and cholesterol intake was overestimated. Results on fiber indicated that 42 percent of meal planners thought their diets should contain more fiber, and over 50 percent thought their diets were about right. Both groups had fiber intakes (11 and 12g, respectively) well below the National Cancer Institute's recommended daily consumption of 20-30 g. Female meal planners adequately assessed their weight condition—that of being overweight or not. About 90 percent of women who were overweight considered themselves to be overweight. Female meal planners were generally aware of the relationship between weight and disease—about 90 percent had heard of some health problem related to being overweight.

#### **f. Research on Determinants of Dietary Status and Survey Methods**

- Knowledge and Attitudes Related to Dietary Choices

A cooperative agreement with the University of North Carolina, Chapel Hill, to analyze 1989 CSFII and DHKS data was completed. The study examined the extent to which knowledge and attitudes about diet and health

independently predict differences in food choices, nutrient intakes, and overall diet quality. Dietary knowledge and attitudes were fairly successful in explaining differences in fruit, vegetable, and grain consumption. The best predictor of meeting recommendations for fruits and vegetables was diet and health awareness. Nutrition knowledge and label use were also positively related. Dietary knowledge and attitudes were associated with differences in overall diet quality, but the magnitude of effects was not large.

- Estimating the Distribution of Usual Intakes of Foods and Nutrients

Under a cooperative agreement with ARS, statisticians at Iowa State University developed a method for estimating the distribution of long-term or usual nutrient intakes, using short-term dietary intake data. CSFII data were used in developing the method. The method allows, for example, determination of the proportion of a population group that has a long-term average intake of a particular nutrient above and below a recommended level when as few as 2 days of intake data are available for individuals in a sample. Plans for publishing the methodology and applying it to data from the CSFII are under way.

Work has begun on the difficult problem of estimating the distribution of usual intakes of foods. This knowledge is necessary for conducting risk analyses related to food safety.

#### **F. Government Policies and Socioeconomic Factors**

An important component in aggregate food demand, and one key in deliberations on the public role in food and agricultural sectors, is the U.S. food assistance programs. Two papers presented by ERS economists at the S-216 Southern Regional Research Committee Symposium address the effects of food assistance programs on food demand. The two papers are described below.

- Measuring the Price and Expenditure Effects of Food Assistance Programs

One author, Levedahl, used a general equilibrium approach to model the impact of in-kind food assistance on the prices of food and nonfood items and expenditures by recipients and nonrecipients. This framework is applicable to commodity distribution programs, such as The Emergency Food Assistance Program (TEFAP) or to coupon-based programs, such as the Food Stamp Program (FSP). Levedahl used the model—which employs published elasticities and *The Survey of TEFAP Recipients*—to estimate the effect of 1986 TEFAP cheese donations (J. William Levedahl. 1994. Measuring the price and expenditure effects of food assistance programs. In H.H. Jensen and J.A. Chalfant, eds.), *Policy Implications for U.S. Agriculture of Changes in*

*Demand for Food*, pp. 173-181. Center for Agricultural and Rural Development, Iowa State University, Ames.

- Impact on Food Consumption of Joint Food Stamp Program and AFDC Program Participation

The authors of the aforementioned article, Ranney and Smallwood, outlined a research program to jointly examine the FSP and Aid to Families with Dependent Children (AFDC) participation, labor supply, and food expenditure decisions in low-income households. This endeavor joins the findings of two largely separate research efforts—one that focuses on the link between FSP and food expenditures and the other that considers the joint determination of AFDC participation and labor supply. Details on how each program works and the structural linkages between them have been identified. A theoretical framework that correctly accommodates the endogeneity of AFDC and FSP participation and household income has been augmented to incorporate food expenditure decisions. Data requirements were identified and directions for the empirical specification were suggested. Estimation of the appropriate augmented model should yield a clearer picture of the decision making low-income households.

Model parameters specifying the links between program characteristics and behavioral responses should be particularly useful to policymakers concerned with providing a cost-effective social safety net that offers needed resources and discourages dependency. Understanding the role of household food preferences is particularly relevant when an important portion of safety-net benefits comes in the form of a cash transfer restricted to food purchases. If households value food stamps differently than cash transfers, the interlinked program participation and labor supply decisions may well be affected. It seems clear that evaluation of alternative policy scenarios can no longer rely on brief analyses or even single-equation parameter estimates. The interrelationships between program parameters, household behavior, and program costs require simultaneous consideration of a number of household choices. Christine K. Ranney and David M. Smallwood. 1994. Impact on food consumption of joint Food Stamp Program and AFDC program participation. In H.H. Jensen and J.A. Chalfant, eds., *Policy Implications for U.S. Agriculture of Changes in Demand for Food*, pp. 183-189. Center for Agricultural and Rural Development, Iowa State University, Ames.

- Domestic Food Aid Programs: Costs, Benefits, Controversial Policy Issues, and Future Expectations for Food Aid

In *Domestic Food Aid Programs, 1994*. In M.C. Hallberg, R.G.F. Spitze, and D.E. Ray, eds. pp. 135-152. *Food, Agriculture, and Rural Policy into the Twenty-First Century: Issues and Trade-Offs*, Westview Press, Boulder, CO. Jean Kinsey and ERS economist David Smallwood present

facts about various food aid programs—their costs, the number of people they serve, and controversial policy issues surrounding the individual programs. They also present estimates of the benefits to direct recipients, producers, and society. Finally, they explore future expectations for food aid.

- Multiple Participation in Domestic Food Assistance

In addition to the Food Stamp Program (FSP), there are smaller programs targeted primarily to subpopulations at high nutritional risk, such as pregnant and nursing women, infants, children, and the elderly, as well as food assistance through such alternative channels as soup kitchens. People may participate in more than one program because there is an overlap in targeted populations among the programs. It is unclear whether participation in multiple programs indicates unnecessary duplication of benefits. More work is required to assess the extent of multiple participation and associated budget costs and nutritional and health benefits.

A major consideration in evaluation of program overlap is assessing the adequacy of food stamp allotments. If FSP allotments are deemed adequate, then program overlap could be wasteful. If allotments are deemed inadequate, then multiple program participation might provide a necessary supplement for household members, such as infants at risk of malnutrition. Benefits from supplemental allotments may or may not reach the intended family member. Thus, some assessment of the effectiveness of alternative benefit delivery mechanisms to target individuals at risk is also needed.

Also unknown is the number of needy people who do not participate in the FSP (homeless, disabled, and others) who might be reached by distribution programs. The ability of food programs to meet individual needs and to target benefits to the appropriate recipients must be weighed against the efficient use of tax dollars. For additional discussion of this issue, see "Multiple Participation in Domestic Food Assistance" by David M. Smallwood (ERS, AIB-664-66, 1993).

- Comparing the Emergency Food Assistance Program and the Food Stamp Program

The Emergency Food Assistance Program (TEFAP), a commodity-based program, and the coupon-based Food Stamp Program can, for a given level of expenditure, serve more needy households than either program can serve alone. TEFAP distributes government surpluses and purchases commodities to needy households. Although TEFAP expenditures (\$300 million per year since 1989) are small compared with those of the Food Stamp Program (\$23.6 billion in FY 1993), a commodity-based program can complement food stamps by distributing food to households unwilling to apply for food stamps because of complicated



application procedures and the stigma attached. TEFAP can also increase awareness of eligibility for food stamps and other Federal assistance. For further information, see "Comparing the Emergency Food Assistance Program and the Food Stamp Program: Recipient Characteristics, Market Effects, and Benefit/Cost" by J. William Levedahl, Nicole Ballenger, and Courtney Harold (ERS, AER-689, June 1994).

- Regulatory Cost-Benefit Assessment of School Meal Reforms

ERS worked closely with FCS to develop cost estimates and economic implications for agriculture of nutrition reforms in the National School Lunch Program. ERS developed a model that accounted for dietary practices and food choices in school lunches, food costs, and nutrient goals. Analysts found that new menus could be developed for school meals that meet the dietary standards at no increase in food ingredient cost. However, doing this would require some changes in the foods served and the commodities from which they were made. The analysis suggested the following changes in commodity usage:

- serve milk containing less than 17 percent of kcal from fat (skim and 1 percent)
- serve beef in mixtures, such as chili, rather than as roasts, steaks, or hamburger patties
- serve lower fat pork products, such as ham, instead of ribs or bacon
- serve more fruits and less fruit juices.

The economic impact of the proposed rule on the major commodity markets and related farm programs would be minimal. Commodity prices, producer marketings and receipts, and farm program outlays under any of the scenarios would not vary significantly from the levels projected in the USDA 10-year baseline projections. (For more detail, see regulatory cost-benefit assessment of school meal reforms. In *National School Lunch Program and School Breakfast Program: Nutrition Objectives for School Meals: Proposed Rule*. *Federal Register*, June 10, 1994, pp. 30218-30251.)

- Changes in Commodity Distribution and Food Assistance Programs

As part of domestic food assistance programs, USDA currently spends nearly \$1.4 billion each year to purchase, store, and transport commodities for distribution to schools, other institutions, and needy persons. Recent concerns about budgetary costs, farm policy, consumer choice, and nutrition assistance objectives have raised questions about the most effective mechanisms for achieving these sometimes competing goals. In *Changes in Commodity Distribution and Food Assistance Programs* (ERS, AIB-664-72, May 1994), analysts Masao Matsumoto and David

Smallwood discuss the origination and intent of these programs, the three basic funding mechanisms, the two types of commodities, the major outlets for USDA commodities, and what is at stake—including viewpoints of critics and supporters, alternatives to keeping the programs operating at the present rate, and what is required of Congress or the Secretary of Agriculture to make program changes.

- WIC Program Expansion

The Clinton administration requested increased funding for the Special Supplemental Food Program for Women, Infants, and Children (WIC) over the next several years to allow participation by all targeted individuals. While backed by strong support, increased funding is likely to raise a number of program operation issues. These issues arise from differences in the income and nutritional risk criteria used for eligibility, food benefit distribution methods, and tailoring of food packages among the States. Operational differences have evolved over the years as a way of maximizing program effectiveness with limited funds. Additional funds are likely to exert pressure for more uniformity among the States. In *WIC Program Expansion* (ERS, AIB-664-71, March 1994), analyst David Smallwood discusses why WIC is one of the most popular and successful food assistance programs, the program operation flexibility allowed the States, the history of program funding and participation, what's at stake in terms of overall costs and program coverage, major factors to be considered in WIC expansion, and USDA information sources.

- Measuring Household Food Security in the Context of Resource Deprivation and Poverty

ERS analyst David Smallwood discusses food security in the context of resource deprivation and poverty in a paper (same title as above) presented at the Food Security Measurement and Research Conference sponsored by Food and Nutrition Service and NCHS, on January 21, 1994, in Washington, DC. He proposes that a subjective measure of food spending be included in a standard food security instrument. Such a measure would be easy to collect, easy to understand, have a predetermined scale of measure (that is, dollars), and provide a link to the evaluation of current program standards. Comparisons could then be made between actual food spending, perceived minimum food spending need, and food assistance levels. It would be straightforward and easy to construct a food security threshold in terms of food needs. In addition, one could use the difference between actual and perceived minimum spending as a measure of the severity of food insecurity. The subjective measure of need would take into account individual household food needs, local food prices, convenience, quality, variety, nutrition, shopping patterns, and other factors. One problem that must be addressed during pretesting is the context and meaning of the minimum need



question. What is meant by food spending? Does it include purchases made with food stamps, WIC vouchers, subsidized school meals? What is the meaning of minimally acceptable?

- Characteristics of Food-Insecure Households

Food insecurity has been addressed in USDA surveys for over 15 years with a question about the adequacy of household food supplies. Previous research has shown that data from this question correlate well with food consumption and nutrient intakes. Donald Rose and James Blaylock of ERS and Peter Basiotis of the former HNIS examined data from 4,406 households interviewed in the 1989-90 CSFII in order to determine the socioeconomic characteristics associated with self-reported food insecurity. A dichotomous variable was used to define households as food insecure if they sometimes or often did not have enough to eat (N=209). Logistic regression analysis revealed that households with incomes below the poverty level or that rented their dwelling were more likely ( $p<0.05$ ) to report food insecurity than others. This was also true of households headed by blacks or single males but not for those headed by single females. Households headed by persons in their 70's and older or with at least some college education were less likely to report food insecurity. When controlling for the above-mentioned factors, indicator variables for Hispanic origin, region, urbanization, and participation in FSP and WIC were not significantly associated with food insecurity. The results indicate that although various household characteristics are associated with food insecurity, the strongest predictor is poverty, as determined by income and household size.

- Social and Economic Predictors of Iron Intake Among Preschool Children

An ERS study investigated household income, food program participation, years of schooling of the household meal planner, and knowledge of iron and anemia as predictors of dietary iron intake of preschoolers. Children, 1-5 years of age, with 3 days of dietary data from the 1989-90 CSFII were included in the sample (N=557). Two measures of intake were analyzed separately: (1) a nutrient adequacy ratio, defined as iron intake divided by the Recommended Dietary Allowances and (2) an index of nutritional quality, or diet density measure, which is the ratio of iron intake to calorie intake divided by the ratio of the RDA's for the two nutrients. Data from the concurrent DHKS were used to create an indicator variable for household meal planners who were aware of anemia as a health problem related to iron intake. After controlling for age, gender, ethnicity, household size, region, and urbanization, multiple regression models revealed that WIC program participation was positively associated ( $p<0.05$ ) to both iron intake measures, while schooling was unrelated to either. Anemia awareness was positively associated with the iron nutrient adequacy

ratio, and household income was positively associated with the iron index of nutritional quality. The findings suggest that dietary iron intakes of preschoolers continue to be affected by economic factors and that food transfer and educational interventions may be useful in improving these intakes.

- Evaluation of Nutrition Education Policy

With a growing consensus on the link between diet and health on one hand and expansion of educational programs on the other, it is becoming increasingly important for USDA to critically assess and evaluate its nutrition education activities. In 1991, an ad hoc committee, appointed by the Human Nutrition Board of Scientific Counselors, recommended that evaluation activities expand beyond descriptive and qualitative assessments to more quantitative assessments which would result in obtaining positive, measurable changes in target groups' nutrition-related knowledge, attitudes, and behavior. Survey results, reports of food intake, and measures of health status would quantify the research. In *Evaluation of Nutrition Education Policy* (ERS, AIB-664-48, May 1994), analysts Jon Weimer and David Smallwood put this issue into historical context and present policy alternatives to address evaluation.

- Strategies for Nutrition Policy

Three articles about food and nutrition policy appeared in the Outlook issue of *Agricultural Outlook* (ERS, January-February 1994, pp. 14-18).

In "Nutrition: Blending Policy & Programs," Ellen Haas, then Assistant Secretary for Food and Consumer Services notes that Secretary Mike Espy's proposed reorganization of USDA will elevate nutrition to a priority mission. The food programs, such as the FSP, WIC, and School Lunch Program, will become nutrition assistance programs. USDA will focus on ways to improve the nutritional quality of school meal programs and will build on the WIC model to make nutrition education integral to all 14 food assistance programs. USDA is planning a national campaign on nutrition education—one that uses more varied media and more creative techniques to produce persuasive and far-reaching communications.

The second article is "Nutrients and Health: Making the Connection" by Marion Nestle, professor and chair, Department of Nutrition, Food and Hotel Management, New York University. The third article is "USDA's Responsibility to Consumers" by Michael Jacobson, executive director, Center for Science in the Public Interest. These two articles examine the dietary guidelines that promote health and outline some changes in food policies and new approaches to nutrition education that could put the guidelines into practice.

Nestle suggests making more programs available that promote fruit and vegetable consumption, for example, subsidies for farmers markets, subsidies for coupons to purchase fruits and vegetables, generic marketing programs, and price supports for producers and marketers of fresh fruits and vegetables. It is essential, Nestle writes, that USDA improve the accuracy and reliability of its three major food and nutrition monitoring databases: the food supply estimates, the nutrient composition of foods (Handbook No. 8), and household and individual dietary intake (NFCS and CSFII). Nestle also calls for an increase in USDA's nutrition education budget, which is currently about \$200 million per year. This amount pales in comparison to the \$12 billion advertising budget of the food industry. USDA could piggyback some of its budget dollars to promote the National Cancer Institute's 5-a-Day program. The message of this campaign—to increase average consumption of fruits and vegetables to five servings a day—is simple, positive, measurable, and easy to evaluate. Getting that message into all USDA school, food assistance, and extension programs could make a big difference.

Jacobson argues that USDA needs to do a better job of informing the public about nutrition and encouraging the public to opt for healthful eating. Nutrition information should be modernized and provided in new formats such as videos, radio and TV announcements, and even billboards. This information should be geared to a variety of education levels, ages, dietary patterns, and ethnic and racial backgrounds. He urges that USDA's Food Guide Pyramid be developed for a more sophisticated audience, that all USDA-sponsored promotions be consistent with sound nutrition advice, and that USDA urge the Federal Trade Commission to issue regulations on food advertising that are fully consistent with FDA's and USDA's labeling rules regarding health and nutrition claims. Jacobson contends that USDA should set better standards for school lunches, require that all food sold in school snack bars and vending machines meet the same standards as school lunches, and supply federally subsidized food commodities of higher nutritional quality. Funding for a major educational campaign aimed at food stamp recipients could come from the money that food retailers and USDA will save as the Electronic Benefits Transfer system is phased in over the next few years.

- Evaluation of the FDPIR Frozen Ground Beef Pilot Project

In October 1993, the Food and Nutrition Service (FNS) began a pilot project to test the feasibility of including frozen ground beef, a perishable product, among the commodities distributed to eligible households in the Food Distribution Program on Indian Reservations (FDPIR). Frozen ground beef was purchased for delivery to 14 Indian tribal organizations and 1 State agency in 4 different regions of the country. The success of the pilot project was assessed

by self-evaluations completed by participating Indian tribes and on-site reviews conducted by FNS regional and field offices. This evaluation, and a projection of the costs of purchasing, storing, and distributing frozen ground beef, led to the decision to expand distribution. Beginning in the third quarter of FY 1995, frozen ground beef was made available to those tribal organizations and State agencies (except in the Northeast and Southeast Regions, due to prohibitive distribution costs) that are capable of safely storing and distributing it. The addition of frozen ground beef, the first frozen commodity provided in FDPIR, affords a greater variety and a more nutritious meat product to households receiving FDPIR benefits.

## **G. Food and Nutrition Information and Education Research**

### **1. Establishing Dietary Guidance Policy**

- The Dietary Change Research Model

Research continued using the Dietary Change Research Model. The mathematical model measures the change required in food consumption patterns of Americans to meet specified nutritional recommendations. Information provided by the model can help professionals gain insight into strategies for implementing a group of nutritional recommendations. An article published in May 1993 described results from a research project looking at the change in women's diets required to meet the 1989 Recommended Dietary Allowances. Plans are being made to update this work with more recent food consumption data from the CSFII 89-91.

- Research Base for the Food Guide Pyramid

The food guide illustrated by the Food Guide Pyramid was developed in the early 1980's to help people use the *Dietary Guidelines for Americans*. The nutritional goals and research base for the food guide were recently updated based on the 1990 *Dietary Guidelines for Americans* and the 1989 Recommended Dietary Allowances. Current data on nutrient composition of foods were used to update the nutrient profiles for each of the guide's food group and subgroup, which are used to assess the guide's ability to meet nutritional objectives. In 1994, research began to update the proportions of specific food items in the composite servings for each food group and subgroup, based on food consumption data from the CSFII. All food codes in the nutrient database for food consumption surveys were reviewed to develop a food guide servings database that lists numbers of servings of each food group or subgroup per 100 g for each food code. This database will be used to identify proportions of specific foods to include when updating composite servings for each food group or subgroup. It will also permit assessment of numbers of food group servings consumed by different segments of the survey population in



order to more specifically target food guidance information to improve food choices.

- Food Guide Pyramid Users' Database

To make research and resources on the Food Guide Pyramid more available to nutrition researchers and educators, ARS is continuing its specialized database initiated in 1993. The database is updated continuously and includes over 330 nutrition education materials that feature the Food Guide Pyramid. The database helps researchers and educators identify research and information gaps. Searches for Food Guide Pyramid-related materials may be done in several ways: (1) upon request, NAL's Food and Nutrition Information Center staff nutritionists can locate information about specific projects (2) individuals can do their own searches if they have access to the Nutrient Data Bank Electronic Bulletin Board or NAL's electronic bulletin board, Agricultural Library Forum, and (3) individuals having access to Internet can search the database.

- Assessment of "Healthy Eating"

Two major research efforts were continued: (1) to develop the research base for an overall measure of diet quality for the U.S. population and population subgroups ("Healthy Eating Index") and (2) to identify knowledge, attitude, and behavior-related questions primarily from the DHKS that are accurate "Indicators of Healthy Eating" (defined as following current dietary recommendations). In preparation for the "Indicators of Healthy Eating" project, a contract was signed with Market Research Corporation of America to identify DHKS-type questions that correlate with healthy eating. For the same purpose, a grant was awarded to the Cooperative Extension System (CES) to further development of a questionnaire to assess the effect of nutrition education programs. While CES efforts focus on the development and use of indicator questions that examine knowledge and behavior of adults participating in CES diet, nutrition, and health programs, the results should be readily applicable to the "Healthy Eating" project. Measurement tools were developed and administered for four of the Dietary Guidelines for Americans: (1) eat a variety of foods; (2) maintain healthy weight; (3) choose a diet low in fat, saturated fat, and cholesterol; and (4) choose a diet with plenty of vegetables, fruits, and grain products. An issue forum on "Assessment of Healthy Eating as an Educational Tool: Methodological Issues" was held as part of the annual meeting of the Society of Nutrition Education on July 19, 1994.

- Food Safety Concerns and Nutrition Concerns

A research study was completed that utilized data from the 1990 and 1991 DHKS/CSFII to examine characteristics associated with various types of food safety concerns and the effect of those concerns on food group intakes. Results

were published in the *Consumer Interest Annual*. The theoretical framework was the health belief model. Among the major findings were that higher education, white race, not living alone, and living in the Midwest were associated with a higher likelihood of food safety concerns. Food safety concern was associated with decreased consumption of vegetables and fruits, and cakes, cookies, pastries, and pies. It was also associated with increased consumption of sugars, grain mixtures, and total beverages, including alcoholic beverages, beer, and regular carbonated soft drinks.

- Vegetable Intake

The question of vegetable consumption was assessed using food consumption data from USDA surveys and partially completed files and procedures from the Food Grouping System (FGS). Use of the FGS, an analytical system that has been in development for several years, allowed for the first-time reporting of total vegetable consumption from all food mixtures and exclusion of nonvegetable ingredients from vegetable products. Results indicated that, on average, individuals consumed about 2 1/2 to 2 3/4 servings of vegetables per day, below the recommendation of 3-5 servings per day. Results were presented at the American Dietetic Association's annual meeting, Anaheim, CA, October 1993. In addition to nutrition educators, data such as these on the total intake of specific commodities are of interest to EPA and FDA.

- Development of Nutrition Education Research Theory and Methodology

The goal of this research is to understand and measure the impact of nutrition research and education activities on the continuum of behavior, eventually leading to a diet that promotes health and well-being. There are several theories of behavior change, for example, the health belief model, the social learning theory, and the diffusion of innovation model. Findings from a project to investigate current nutrition education research theory and methodology and suggest approaches for improvement were published in the article "Quantitative Nutrition Education Research: Approaches, Findings, Outlook" in the *Journal of Nutrition*, September 1994. A related paper, "USDA's New Diet and Health Knowledge Survey: How Can It Be Used for Theory-Based Research?" was accepted for publication in *The Journal of the Association for the Study of Food and Society*.

- The Food Label as an Educational Tool and Research on Nutrition Label Use

Research continued on the characteristics of nutrition label users. Results from this and other research projects were incorporated into a reference guide on new nutrition labeling regulations. The publication is targeted for

information multipliers—food editors, writers, extension staff, and other health professionals and educators—who will be explaining to their audiences how to use the new food label in conjunction with the Food Guide Pyramid to choose a healthful diet. This publication, “The Food Label, the Pyramid, and You,” USDA Home and Garden Bulletin No. 266, September 1994, is available from ARS.

Research on use of the nutrition label continued. Results of a research study on characteristics of nutrition label users and the effects of nutrition label use on diet quality were submitted for publication in a professional journal. Among major findings were the following:

1. Label use was positively associated with nutrition knowledge and with belief in the importance of following the principles of the *Dietary Guidelines for Americans*. Label users were more likely to believe that it was important to moderate cholesterol, fats, saturated fat, and sodium, and to increase complex carbohydrates, fiber, and variety (contrary to the popular belief that consumers only use the label to avoid specific components).
2. Label use was positively associated with intake of vitamin C and negatively associated with intake of cholesterol. A project investigating the use of low-fat foods by label users versus nonusers began in September 1994.

- Research on the Food Situation of Single Adults

Center for Nutrition Policy and Promotion researchers from ARS examined the food expenditures, food shopping behavior, and diet quality of single adults and compared the findings with those of adults in multiperson households. A report “How Does Living Alone Affect Dietary Quality” (HERR No. 51) was published in 1994. Among major findings were that diets of adults living alone were significantly lower in food energy, protein, total fat, saturated fatty acids, phosphorus, calcium, and sodium; however, diets of women living alone were significantly more nutrient dense in vitamins A, C, E, and B<sub>6</sub>, carotene, riboflavin, niacin, folate, and magnesium, iron, and fiber compared with diets of females living in multiperson households. Diets of men living alone were more nutrient dense in niacin, folate, and vitamin B<sub>6</sub>.

- Research on the Food Situation of Single-Mother Families

In collaboration with USDA’s former Family Economics Research Group (now part of CNPP), ARS researchers examined the food expenditures, food shopping behavior, and diet quality of families maintained by female single parents. A paper summarizing their findings was published in the *Family Economics Review*. Among major findings

were that (1) children of single mothers are substantially less likely to consume fruit or fruit juice on a given day than children with married mothers (37 percent versus 53 percent, respectively), and (2) compared with married mothers, single mothers were substantially less likely to report daily usage of three food groups: fruit and fruit juices, vegetables, and milk and milk products. Selected findings from this project were also presented at the Marketing and Public Policy Conference, May 1994.

- Implications of Changes in the U.S. Food Supply for Nutrition Education

ARS assessed trends in the per capita food and nutrient supply in relation to current dietary guidance. An abstract, “Does the U.S. Food Supply Reflect Dietary Recommendations” was reported at the Society for Nutrition Education as a poster at the 1995 annual meeting. Trends in the use of specific foods and their nutrient contribution between 1970 and 1990 show that over time, the food supply has generally been responsive to dietary guidance on fat, saturated fatty acids, cholesterol, and carbohydrate.

- Food Preparation Research

Ongoing research in ARS’s Food Research Laboratory provides information used in materials that show consumers how to implement the dietary guidelines in food preparation. Moderation of fat, saturated fatty acids, cholesterol, sugars, and sodium requires modification of ingredient amounts and techniques for food preparation.

Research continues to show that consumers want recipes in nutrition education materials. Recipes provide a practical approach to communicate dietary guidance information. All recipes developed for publications or through research are evaluated by a trained taste panel for appearance, texture, flavor, and overall acceptability. Recipes also emphasize basic food safety rules and how to choose and prepare foods moderate in cost, with a minimum of effort, in keeping with today’s lifestyles.

Recipes were recently developed to illustrate how servings of food groups in the Food Guide Pyramid are counted in mixed dishes. The recipes were incorporated into a research report for nutrition educators to use in educating consumers on how to use the pyramid in planning menus. Although consumers measure foods by volume (cups, tablespoons), foods measured by weight are required for food consumption monitoring, reports on the nutrient content of foods, and recipe development. The Food Research Laboratory develops data to convert the volume measurements into weight measurements.

- Nutrition Label Education for Consumers

Based on research on the information needed to help consumers use the new food label as a tool in achieving a



healthful diet, ARS prepared a brochure which identifies label features that consumers can use to follow the *Dietary Guidelines for Americans*. This publication is part of the educational outreach of the National Exchange for Food Labeling Education and is a companion to the FDA-FSIS brochure "Read the Label, Set a Healthy Table—An Introduction to the New Food Label."

- Guidance on Using the Food Guide Pyramid

A report entitled "Using the Food Guide Pyramid: A Resource for Nutrition Educators," was prepared. Specifically, the report describes how to count servings from the food groups in menus for a day's diet, how mixed foods and recipe items contribute to food group servings, and how to adapt a single menu to individuals who have different calorie and nutrient needs. The report includes 23 recipes and 5 menus at each of 3 calorie levels as examples. The report was released as an electronic publication by the Center for Nutrition Policy and Promotion in 1996. For more information, contact CNPP, 1120 20th Street, N.W., Suite 200, North Lobby, Washington, DC 20036-3476.

- USDA's Dietary Analysis Program

Distribution of USDA's dietary analysis program continued through the National Technical Information Service and the ARS Nutrient Data Bank Bulletin Board. The program is to be used in consumer nutrition education programs at worksites, community health centers, health fairs, and the like. It features a user-friendly, menu-entry approach for selecting foods from about 850 items commonly reported in USDA's food consumption surveys. It allows users to analyze up to 3 days of food intake for calories and 27 nutrients and food components. Program output helps consumers identify major food sources of nutrients in their diets and explore ways to change food selections to improve their nutrient intakes.

- Research Conference on Evaluating Nutrition Education

During FY 1994, the Food and Nutrition Service [now Food and Consumer Services (FCS)] began planning for a research conference on nutrition education. The conference will focus on how to evaluate the effectiveness of nutrition communication and education programs, especially as they relate to FCS food assistance and nutrition education programs and target groups. The goal is to advance the state of the art when evaluating nutrition education and communication efforts. The conference is important because social research evaluation methods can be complex and expensive, and FCS invests over \$150 million per year in nutrition education interventions. The conference will enable the Department to identify evaluation methods that are not dependent on costly traditional models and will enhance development of such models in places where they are not now available.

- Barriers to Good Nutrition

FCS contracted Lisboa Associates to explore barriers to good nutrition subject to modification through improved education. Using analyses of databases and new sociological-psychological data collected from focus groups, this study will identify Food Stamp Program (FSP) households that meet the Recommended Dietary Allowances in a manner consistent with the *Dietary Guidelines for Americans* and that have food expenditures under 131 percent of the Thrifty Food Plan. These households will be compared to the characteristics of FSP households that do not meet nutrient targets or have household food expenses above 130 percent of the Thrifty Food Plan. Factors to be examined include food choices, purchasing patterns, kitchen facilities, food and nutrition knowledge, attitudes about healthy food choices, and lifestyle components that are potential barriers to good nutrition.

- National Survey of Food Stamp Recipients

In FY 1994, FCS awarded a contract for the first study specifically of FSP issues that will look at a nationally representative sample of food stamp recipients. FSP served an average of 27 million individuals every month in FY 1994. The survey will collect data on household food security, food assistance utilization, experience with FSP, and household sociodemographics from 2,400 households. Follow-up interviews with 900 FSP households will collect data on food shopping patterns, food expenditures, and household food use.

- WIC Food-Purchasing Study

FCS plans to study the food-purchasing patterns of WIC participants. While FCS collects data on the aggregate dollar value of food instruments that are redeemed, it does not have access to data on the types of foods redeemed. This study will use two sets of electronic information. First, UPC scanner code data, obtained at point of sale from retail food stores, will be used to examine recipient food-purchasing and nutrient patterns by category of participant. Second, WIC State agency administrative data will provide information on which foods were prescribed and demographics. The information produced will allow FCS to determine (1) which foods are prescribed, which are redeemed and in what quantities, and which are not and (2) whether WIC food purchasing patterns differ by ethnicity.

- WIC Nutrition Education Demonstration Study

The WIC Nutrition Education Demonstration Study will examine the effectiveness of WIC nutrition education programs at a small sample of WIC clinics. The primary objectives are to (1) examine the effectiveness of the education programs in increasing prenatal participants' knowledge of nutrition; (2) test the effectiveness of innovative education programs in increasing participants' knowl-

edge of nutrition; (3) determine if the innovative programs cost more, less, or the same as the current programs; and (4) examine the effectiveness of a WIC nutrition education program for young children.

- Study of WIC Infant Feeding Practices

FCS conducted a study to obtain information on infant feeding practices among WIC participants, such as pre- and postnatal influences on infant feeding practices, attitudes and practices relative to breastfeeding, and use of foods in the WIC package. The study used a series of questionnaires developed by FDA, but modified to meet FNS's needs for information specific to the WIC population. Data were collected by telephone and, for a subset in person, at 10 times over the year. The data collection period was ongoing until late 1995.

- Adult Day Care Study

This study found (1) an estimated 43 percent of centers eligible for the program participated; (2) Child and Adult Care Food Program centers provided about three meals and snacks per day; (3) most clients who attended CACFP centers were elderly, female, and white although substantial percentages of men, nonelderly, and nonwhite clients participated; (4) 84 percent of adults who attended CACFP centers had incomes of less than 130 percent of the U.S. poverty threshold; and (5) 44 percent of CACFP clients had one or more dietary restrictions.

The meal patterns most commonly claimed for reimbursement are breakfast, lunch, and an afternoon snack (24 percent) and lunch only (23 percent). The adult component of the CACFP supplies lunches that provide at least one-third of the RDA's to participants. The typical CACFP client consumes somewhat below the RDA for food energy but has adequate intakes of most other nutrients over a 24-hour period.

The main reasons for a center's nonparticipation in CACFP are (1) lack of knowledge or information about the program; (2) ineligibility because of such factors as lack of licensing or no provision of meals; and (3) perceived burden of recordkeeping in relation to reimbursement levels.

## **H. Food Marketing and Demand**

### **1. Studies of Food Supplies, Prices, Expenditures, Marketing Costs, Safety, Technology, and Consumer Demand**

- Food Supply Historical Series and Outlook Reports

The Economic Research Service annually calculates the amount of food available for human consumption in the United States and publishes the information in *Food Consumption, Prices, and Expenditures*. The 1994 bulletin

covers the period 1970-93 (ERS, SB-915, December 1994). It presents historical data on per capita consumption of major food commodities, including the basic data on supplies and disposition from which the consumption estimates are derived. In addition, information concerning population, income, prices, and expenditures related to food consumption was assembled as a comprehensive and convenient source of data for statistical and economic analysis of food consumption. An electronic database containing the data in this report is available.

ERS also analyzes the current situation and forecasts the short-term outlook for major agricultural commodities, agricultural trade, agricultural finance, agricultural resources, and world agriculture in a host of periodic outlook reports, *Agricultural Outlook* (published 11 times a year), and *FoodReview* (published three times a year).

- Steady Success for Tomatoes

Tomatoes are the most widely consumed vegetable in the United States, after potatoes. A new class of processed tomato products—first juice, then pizza sauce, then chili sauce, and now salsa—has become a food classic nearly every decade since the 1920's. Rising health consciousness, the increased popularity of salad bars and fast-food restaurant meals, and interest in ethnic foods have continued pushing up use of fresh tomatoes. For more details, see "Tomatoes: A Success Story" by Gary Lucier in *Agricultural Outlook* (ERS, July 1994, pp. 15-17).

- Americans Are Eating More Strawberries and Paying Less for the Pleasure

Americans have doubled their strawberry consumption over the last 2 decades, and among U.S.-grown fresh fruits, strawberries are now second only to apples in value. Improved varieties, routine soil fumigation, the concentration of production in California (80 percent of the U.S. crop), and California's switch to an annual cropping system have raised yields and decreased costs. As a result, retail prices have remained relatively stable during the last 2 decades. For more information, see "Strawberry Yields Have Lowered Prices" by Diane Bertelsen in *Agricultural Outlook* (ERS, March 1994, pp. 13-15).

- U.S. Fresh Fruit Export and Consumption Estimates

From 1978 to 1989, the United States exported more fresh fruit than the amount reported by the Census Bureau. Import data made available by Statistics Canada revealed that some shipments from the United States to Canada had not been counted. Using the Canadian data raised total U.S. fruit exports and lowered consumption. ERS determined that U.S. consumption of citrus fruits was 5 percent lower and consumption of noncitrus fruits was 1 percent lower than previously estimated. Since 1990, the Census Bureau has used Canadian import data as a measure of U.S. exports



to Canada. "U.S. Fresh Fruit Export and Consumption Estimates, 1978-92" by Diane Bertelsen (ERS, Statistical Bulletin No. 875, April 1994) reports the revised U.S. exports and per capita consumption for 13 fresh fruits: grapefruit, lemons, limes, oranges, tangerines, apples, avocados, sweet cherries, grapes, peaches and nectarines, pears, prunes and plums, and strawberries. The report also includes 40-year trends for fresh fruit consumption.

- Marketing Practices for Vegetables

An ERS report describes vegetable marketing practices of first handlers (firms that receive growers' vegetables), provides estimates of each method's prevalence, and explains the basic motivation for each procedure. Over time, these practices have evolved and expanded, with some becoming more important than others. For instance, in the case of fresh precut vegetables, a new market that emerged during the early 1980's, first handlers negotiate agreements with buyers of fresh precut vegetables and agree to a selling price during a 6- to 12-month period. This method departs from the traditional practice of selling most fresh produce at the prevailing wholesale price. New pricing methods and changes in the importance of existing marketing practices have implications for public policy. For more information, see *Marketing Practices for Vegetables* by Nicholas J. Powers (ERS, AIB-702, August 1994).

- Advertising and the Demand for Cheese and Milk

Generic advertising raised fluid milk sales about 4.3 percent, or almost 8 billion pounds, between September 1984 and September 1992. Sales of natural and processed cheese consumed at home rose by about 18 million pounds and 358 million pounds, respectively, in the same period because of increased generic advertising. An assessment of 15¢/100 lb weight of milk sold commercially, mandated by the Dairy and Tobacco Adjustment Act of 1983, funded the increase in advertising. ERS analysts use econometric demand models to control for variables that influence the demand for milk and cheese. These variables include generic and branded advertising, market prices, income, and demographic characteristics. For more information, see *An Evaluation of Fluid Milk and Cheese Advertising* by Theresa Sun, James Blaylock, and Noel Blisard (ERS, Technical Bulletin No. 1828, November 1993).

- Egg-Market Switch

During the 1980's, annual egg consumption averaged a 4-egg-per-person decline, dropping from 278 in 1979 to 237 a decade later. This breaks down to a 5-egg-per-year decline in whole-egg consumption and an offsetting 1-egg-per-year increase in eggs used in processed foods or sold to food service operators in liquid form. Since 1990, the per capita decline in use of shell eggs has slowed to an average of 3 fewer eggs per year, and the increase in egg product use has risen to 2.5 additional eggs. This yields a decline of 0.5

eggs per year in total egg consumption in the first half of the 1990's, to an estimated 234 for 1994. If current trends in egg consumption continue through the second half of the 1990's, one-third of all eggs will be consumed in processed form by the year 2000. Several factors are behind the steady growth in processed egg products. The traditional market for processed eggs—as ingredients in pasta, cake mixes, and other baked goods—has continued to grow. And the increased safety and convenience of liquid egg products is encouraging use of pasteurized egg products in institutional food service and in restaurants. For more information, see "Decline in Egg Consumption Slows" in *Agricultural Outlook* (ERS, July 1994, p. 12).

- Estimating the U.S. Demand for Sugar

Inaccurate measurements of the price data for sugar substitutes is a problem encountered in the estimation of the demand for sugar. In "Estimating the U.S. Demand for Sugar in the Presence of Measurement Error in the Data" by Noel Uri (ERS, *The Journal of Agricultural Economics*, Summer 1994, pp. 17-30), two diagnostics are introduced. These assess the effect this measurement error has on the estimated coefficients of the sugar demand relationship. The regression coefficient bounds diagnostic is used to indicate a range of consumer responsiveness to changes in the price of sugar. The bias correction factor is computed to evaluate overestimation of the amount of beverage sugar and nonbeverage sugar demanded due to price changes.

- Future Growth of High-Intensity Sweeteners May Not Be as Sweet as in Recent Years

High-intensity—also called low-calorie or artificial—sweeteners are increasingly used in a wide range of "diet" foods and beverages. In fact, growth has firmly established them as a third major sweetener option, along with sugar and corn sweeteners. Some industry sources estimate that beverages—mostly soft drinks—represent 60-75 percent of total U.S. consumption of high-intensity sweeteners. Tabletop sweeteners use 20-35 percent and commercially prepared foods use 5-15 percent. Industry sources indicate the market for tabletop sweeteners has limited growth. There seems to be more potential for growth in commercially prepared foods, but it is not yet fully clear if it can be realized. For more information, see "Have High-Intensity Sweeteners Reached Their Peak?" by Peter Buzzanell in the *FoodReview* (ERS, September-December 1993, pp. 44-50).

- Coffee Consumption Stages a Comeback

Although overall U.S. coffee consumption and sales have increased modestly in recent years, the gourmet segment of the market has exhibited strong growth, reflected in the increasing number of coffee bars that retail specialty coffee. In 1993, U.S. per capita consumption of all coffee increased. Based on a National Coffee Association (NCA) survey,



consumption averaged 1.87 cups per person per day, up 8 percent from the 1987-91 annual average, and up 7 percent from 1991 (no survey was conducted in 1992). However, 1993 consumption is still well below its peak of 1962, when use of all types of coffee totaled 3.12 cups per person per day. NCA estimates 1993 per capita consumption of regular coffee, the most popular type, at 1.61 cups and decaffeinated at 0.28 cups. Instant coffee consumption was 0.25 cups per person, down from its peak of 0.75 cups in 1974. For further information, see "U.S. Coffee Market Percolating Again" by Peter Buzzanell and Fred Gray in *Agricultural Outlook* (ERS, June 1994, pp. 13-15).

- Benefits Outweigh Costs

The \$4.5 billion estimated benefits of the new nutrition label are significantly larger than the estimated costs to industry of \$1.6-\$2.6 billion. The benefits calculated were based on consumer response to shelf labels and may underestimate response to food product labels. In addition, food manufacturers may reformulate some products to improve the nutrition profile, given the high visibility of this information under the new labeling regulations, which could further improve dietary intakes. For more information, see "New Nutrition Labels Make Debut" in *Agricultural Outlook* (ERS, May 1994, pp. 20-22).

- Food Prices Rise Modestly

Retail food prices in 1993, as measured by the Consumer Price Index (CPI), averaged 2.2 percent above those in 1992. This increase, following 1992's 25-year record low increase of 1.2 percent, was still modest compared with the 3-percent advance in the CPI for all goods and services in 1993. Food price inflation in 1993 was substantially less than the overall increase in the CPI for the third consecutive year.

Food prices in 1993 rose more at supermarkets and other grocery stores than at restaurants. Food prices in grocery stores rose 2.4 percent, and prices for restaurant meals advanced by only 1.8 percent. Prices of restaurant meals increased less in 1993 than they had the year before and by the smallest amount since 1964. Grocery store prices of foods advanced more strongly in 1993 than in 1992, led by higher prices for fresh vegetables, red meats, and poultry. Higher prices resulted in part from cold, wet weather that cut meat and vegetable production early in the year.

A variety of factors kept food price increases moderate in 1993. Continued lackluster growth in the economy and heightened competitive challenges in most food business segments played important roles. Slow growth in personal disposable real income and weak consumer confidence held down food spending and opportunities to raise prices. Food businesses, responding to competitive pressures and consumer resistance to higher prices, had to hold down

costs. For further information, see "Food Costs...from Farm to Retail in 1993" (ERS, AIB-698, April 1994).

- The Farm-to-Retail Price Spread

Consumers, farmers, and legislators want to know what causes food prices to change. They are also interested in the difference between what farmers get for the food they sell and how much consumers pay for that food, commonly referred to as the farm-to-retail price spread. To answer these concerns, Congress directed USDA to measure price spreads for food originating on U.S. farms. An ERS report presents USDA's findings for 1993, including answers to the following questions: How much are food costs changing? Why? How much of consumer food dollars goes to the farmer and how much to food processors and marketers? How did farm-to-retail price spreads change in 1993, both for a market basket of food and for such food groups as meat and dairy products? How have recent developments affected food industry costs, profit margins, and productivity? How much did Americans spend for farm-produced food, and how were these dollars divided among costs of producing and marketing food? For further analysis, see *Food Cost Review, 1993* (ERS, AER-696, August 1994).

- Food Prices To Post Small Rise in 1995

ERS forecasts a modest rise of 2-4 percent in the CPI for food in 1995, slightly ahead of the preceding 2 years. The general economy will probably expand more slowly than it did in 1994, and employment will rise only slightly—adding little upward pressure on food prices from consumer demand. The overall rate of inflation is forecast to be 3.4 percent in 1995, up from 2.6 percent in 1994.

ERS forecasts the CPI for all food, food away from home, and food at home, including 16 subaggregates of food at home. An annual forecast is released each year in the October issue of *Agricultural Outlook* (published by ERS) and updates appear periodically in the same publication.

- Food Spending in American Households

Average annual food expenditures in urban households rose 59 percent from \$985 per person in 1980 to \$1,567 in 1992, while per person income rose 94 percent from \$6,916 to \$13,398. As a result, the percent of household income spent on food declined from 14.2 to 11.7 percent. Annual spending per person for food consumed at home rose 55 percent from \$667 to \$1,036, while food consumed away from home rose 69 percent from \$318 to \$536. During this period, food prices rose 58.9 percent for total food, 54.8 percent for food at home, and 68.7 percent for food away from home. *Food Spending in American Households, 1980-92* by David Smallwood, Noel Blisard, James Blaylock, and Steven Lutz (ERS, SB-888, October 1994) presents information on trends in household food expenditures for major

food groups by selected demographic factors. Information is also presented on household income and food price trends. The data are from the 1980-92 Consumer Expenditure Diary Surveys prepared by the Bureau of Labor Statistics, U.S. Department of Labor.

- Total Food Expenditures

Americans spent \$617 billion for food in 1993 and \$86 billion for alcoholic beverages. Away-from-home meals and snacks captured 46 percent of the U.S. food dollar in 1993, up from 34 percent in 1970 and 24 percent in 1950. ERS prepares annual statistics of total dollar expenditures for food at home and away from home. These figures include all food, regardless of who pays for it. Total food expenditures are further broken down into the share paid for by families and individuals and those paid for by governments and businesses. Annual statistics are published in *Food Consumption, Prices, and Expenditures* and monthly figures in *Agricultural Outlook*, both published by ERS.

- The Food Marketing System in 1993

Sales in the food marketing system rose 3.6 percent in 1993 because of U.S. economic growth that year. Retail food price increases were moderate (2.2 percent). Competition for scarce shelf space, heavy couponing, and record new products were indicators of aggressive competition. *The Food Marketing System in 1993* by Anthony E. Gallo (ERS, AIB-706, September 1994) analyzes and assesses yearly developments in the nation's food marketing system. These developments relate to industry growth, structure, conduct, and performance of the institutions—food processors, wholesalers, retailers, and food service firms.

- Research To Develop and Maintain USDA Food Plans at Different Cost Levels

Each month, the cost of following USDA's four food plans—thrifty, low cost, moderate cost, and liberal cost—are estimated for the 48 conterminous States. These estimates are based on updated food price information from the Bureau of Labor Statistics. Results are released monthly by the Department in press releases. Benefit levels for the Food Stamp Program (FSP) are established by USDA using the food costs estimated for the Thrifty Food Plan. Food costs estimated for Alaska and Hawaii establish separate benefit levels for the FSP in those two States. Food plan costs for the United States are published in the *Statistical Abstract of the United States, 1994* (U.S. Department of Commerce, Bureau of the Census).

## 2. Studies on Improving Food Marketing

- Consumer Awareness for Aquaculture Products

Marketing strategies for increasing consumer awareness of aquaculture products are being developed by the Nebraska

Department of Agriculture with an Agricultural Marketing Service grant. The program will include in-store demonstrations and directories designed to get consumers thinking about locally produced aquaculture products when shopping.

- Farmers' Market Directory

A directory of farm food producers and buyers in New Jersey will be developed by that State's Department of Agriculture using an AMS grant. The directory will identify farm markets, seasonal availability, and the products produced. Of those included, many are small farms that typically need marketing assistance.

- Community-Supported Agriculture

Community-Supported Agriculture (CSA) refers to a system that enables farmers and consumers to work cooperatively. Consumers purchase shares or subscriptions to the year's harvest. One share is enough to feed a household of four or five. These shares are paid in advance to help the farmer purchase seed, equipment, and labor. A series of mentor-relationship meetings will be held in Wisconsin between interested and established CSA farms using an AMS grant.

## III. Nutrition Education and Information

The FCS mission is to alleviate hunger and safeguard the health and nutritional well-being of the nation through the administration of nutrition education and domestic programs. FCS is the largest Federal funding source for nutrition education. It provides grants to States and Indian tribal organizations for nutrition education in the WIC program, the Food Distribution Program on Indian Reservations (FDPIR), and the child nutrition programs and provides matching funds for nutrition education in the Food Stamp Program (FSP). It also develops nutrition education materials for food assistance program operators and provides technical assistance for the nutrition education components of sponsored programs.

The Nutrition Education and Training Program (NET) is an adjunct program to the child nutrition programs and promotes healthy eating for children in schools and child care facilities. The nutrition education activities are coordinated with the National School Lunch and Breakfast Programs, the Child and Adult Care Food Program, and the Summer Food Service Program. States use NET funds to teach educators the principles of nutrition and how to make them meaningful to their students; provide training for food service personnel; support classroom experiences that can be applied in the school cafeteria and child care settings; involve parents; and develop educational materials.

In FY 1994, a major technical assistance project at the Federal level was development of a new *Needs Assessment Guide for the Nutrition Education and Training Program*.



Training on using the guide was provided at four USDA regional conferences in spring 1994.

#### **A. USDA's Responsibility To Ensure the Federal Government "Speaks With One Voice" When Issuing Dietary Guidance**

- Promotion of the Food Guide Pyramid

The Food Guide Pyramid, released by USDA, has been very well received by the professional community and the public. In addition to extensive use within the Federal Government, the pyramid is used by the food industry, media, educators, and others in the private sector. The pyramid graphic is used by the food industry on labels and promotional materials. Private-sector groups use the pyramid for various consumer audiences in materials such as posters, videos, curriculum guides, games, pamphlets, and computer software. ARS staff give presentations on the research and development of the Food Guide Pyramid and its uses at local and national professional meetings. Staff also help others who are developing materials and programs using the food guide.

FCS developed "Building Better Eating Habits" based on the Food Guide Pyramid. Targeted to participants in FSP, a four-color brochure and companion poster present the concepts of the Food Guide Pyramid in an easy-to-read format. A booklet introduces the concepts of serving sizes versus helpings, explains how to cut down on fat in the diet, and tells how to determine if the recommended number of servings from the food groups are being met.

- Consumer Education

Consumer education efforts of the Food Safety and Inspection Service (FSIS) employ a variety of methods, such as booklets, public service radio announcements, fact sheets, feature stories, educational videos, video news releases, and radio features. The FSIS Meat and Poultry Hotline receives more than 137,000 calls a year on meat and poultry, nutrition, and food safety issues. Education programs mainly address consumers and those who influence consumers, such as media and health and nutrition professionals. FSIS works closely with USDA's Extension Service, FDA, and other groups with compatible educational goals.

FSIS continues to target some materials to more specific audiences. For example, it prepared information materials for restaurant employees on how to prevent foodborne illness. Educational materials are being revised to reach the most susceptible populations about complications from foodborne illness.

A major campaign on hamburger safety, launched in May 1994, resulted in requests for 3 million safety message cards concerned with the thorough cooking of hamburgers. This campaign is being conducted by USDA and the National Association of School Nurses.

FSIS and FDA opened a Foodborne Illness Education Information Center for educators at the National Agricultural Library (NAL) in Beltsville, MD.

FSIS held its third joint teleconference with FDA and State public health departments on September 23, 1994, on "Food Safety Challenges of Raw and Partially Cooked Foods."

FSIS also provides education on the new nutrition label through the National Exchange for Food Labeling Education (NEFLE), which also includes FDA and consumer, trade, and health organizations. NEFLE has four main components: information exchange, research, media relations, and development of educational materials and programs.

An important feature of the campaign is an information center at NAL. The center encourages public- and private-sector organizations to exchange information about their food-labeling education activities and make it easier for organizations to initiate and find partners for label education programs. The center operates an electronic bulletin board on food labeling education, publishes a periodic update of educational activities, answers inquiries, refers callers to organizations and food-labeling experts, and sponsors video teleconferences.

#### **B. Programs Initiated or Expanded**

##### **1. Food and Consumer Services Programs**

- WIC Farmers' Market Nutrition Program

Congress earmarked \$5.5 million of the FY 1994 WIC program appropriation for the Farmers' Market Nutrition Program. In FY 1994, State agencies administered the program in California, Cherokee Nation (Oklahoma), Connecticut, District of Columbia, Indiana, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, North Carolina, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Rhode Island, South Carolina, Texas, Vermont, Washington, and West Virginia.

- Special Nutrition Education Funds for the Food Distribution Program on Indian Reservations

FCS administers the Food Distribution Program on Indian Reservations (FDPIR), an alternative to the Food Stamp Program for eligible households living on or near an Indian reservation or for Native Americans who reside in Oklahoma. At the close of FY 1994, 91 Indian tribal organizations and 6 State agencies operated FDPIR on 244 Indian reservations. In FY 1994, \$150,000 was earmarked for improving nutrition education for FDPIR participants on Indian reservations. This money was made available for FNS regional offices either to purchase nutrition education publications and materials for Indian tribal organizations or to provide competitive grants for Indian tribal organizations



to conduct training and projects in nutrition education. The grants supported a wide variety of culturally relevant approaches to nutrition education, including the production of videos.

- Training on the Use of Fresh Produce in Schools

In 1994, USDA doubled the amount of fresh fruits and vegetables available to schools. At the same time, FNS facilitated and sponsored training for State and school food authority staff in all of the FNS regions on the proper storage, handling, and preparation of fresh produce.

- National Food Service Management Institute

The National Food Service Management Institute (NFSMI), located at the University of Mississippi, in cooperation with the University of Southern Mississippi, conducts applied research and provides education and training, satellite seminars, conferences, and staff development to assist schools in providing high-quality, nutritious, cost-effective meal service to children. The institute offers a clearing-house. NFSMI received \$1.85 million in FY 1994, and is administered by FCS through a grant agreement.

## **2. Cooperative Extension System**

### **a. General**

The Cooperative State Research, Education, and Extension Service of the Cooperative Extension System (CES) is a publicly funded, informal educational system that links the educational and research resources and activities of USDA, 74 land-grant universities, and 3,150 county administrative units. National program leaders provide leadership and coordination at the Federal level. State partners with subject expertise are located at the land-grant colleges and universities and at the 1890 institutions and Tuskegee University. A network of county partners, paraprofessionals, and volunteers are located in communities in the States and territories. This 3-tiered system allows information and resources to flow among Federal, regional, State, and local sources in an interactive manner, often referred to as Extension's "grass roots" communications network.

### **b. The Nutrition, Diet, and Health Base Program**

Base programs are the educational efforts central to the mission of the System and common to most Extension units. The seven base programs are

- agriculture
- community resources and economic development
- family development and resource management
- 4-H and youth development
- leadership and volunteer development
- natural resources and environmental management
- nutrition, diet, and health.

Issues addressed in the nutrition, diet, and health program include Healthy People 2000 national health promotion and disease prevention objectives; food safety and quality; health considerations in agricultural food production, processing, and distribution; hunger; at-risk families; and consumer and public policy concerns.

- Strategic Plan for Nutrition, Diet, and Health Base Programs

In 1994, the Extension Service completed a strategic plan for nutrition, diet, and health base programs in the CES. The plan proposed a common vision for nutrition education and suggested activities to realize that goal. The plan will guide the CES nutrition, diet, and health base program and serve as a model for State, territorial, and local nutrition, diet, and health strategic planning.

### **c. National Initiatives**

- Plight of Young Children

The Plight of Young Children Initiative, which focuses on limited-resource children from before birth to age 5, works with the families and communities where these children reside. The initiative is multidisciplinary and addresses many critical needs by offering programs in nutrition and health, money management, and parenting. States are beginning to work on programs to meet the many needs of this population.

- Decisions for Health

In late 1994, the Decisions for Health National Initiative awarded funds for a State-multi-institution project in the southern region that would develop a model curriculum for adults in comprehensive health education. Food and nutrition concepts will be incorporated into the health curriculum. One goal of this initiative is to induce families and individuals to adopt healthy lifestyles by reducing high-risk behaviors and assuming responsibility for personal health decisions. Healthy People 2000: Objectives for the Nation forms the suggested action plan for this effort through 22 objectives. Local communities are encouraged to convene strategic planning groups that address the objectives of greatest need in the community.

- Food Safety and Quality

Through the Food Safety and Quality Initiative, CES works to improve the ability of all components of the food system to make informed, responsible decisions related to food safety and quality. Target audiences are producers, processors, distributors, retailers, and consumers.

The FY 1994 Congressional appropriations for the Extension Service (ES) funded the development of food safety

and quality educational programs and updated and improved the Food Animal Residue Avoidance Databank (FARAD). More than 30 model programs addressing four priority areas were funded. The program emphasized the transfer and dissemination of model programs and evaluation of their effectiveness. New programs were funded only if they addressed an identified gap. The projects concentrated resources and produced curricula or educational methods in the following areas: (1) food handler training, especially for those who serve high-risk individuals and who have limited resources for training; (2) risk education with youth and adults; (3) enhanced utilization of the Food Animal Residue Avoidance Databank in educational programs; and (4) model Hazard Analysis and Critical Control Points (HACCP) and Total Quality Management (TQM) programs in agricultural production and food processing and retailing.

Ensuring and communicating food safety requires innovative educational approaches, such as those currently in use by CES. Several model programs for educating particular segments of the public and food production personnel are listed following:

Auburn University, HACCP Approach to Food Safety in Alabama; University of Delaware, Food Safety Education for Youth; University of Florida, Enhancing the Role of the CES in State Food Handler Certification Programs; University of Idaho, Expanded Practical Food Safety for Food Service Supervisors; Iowa State University, Use of TQM and HACCP to Improve the Preharvest Safety of Beef, Milk, and Lamb; University of Kentucky, Training Food Service Workers To Reduce Foodborne Illness; Louisiana State University, Helping Youth Explore Emerging Food Production and Processing Technologies; University of Maine, Safe Food Laws Through Better Informed Public and Legislators; University of Massachusetts, Expansion of the Massachusetts Model for Food Safety Education of High-Risk Groups; New Mexico State University, Food Safety and Quality Science Fellows Program; University of Rhode Island, Rhode Island Small Food Processors Network; Clemson University, Food Safety Education for Teachers; University of Tennessee, National Recommendations for Disaster Food Handling; and University of Puerto Rico, Food Handlers Training Program in the San Juan Region.

- ES-WIC Nutrition Education Initiative

Pregnant women, nursing mothers, mothers with young children, and children from birth to 5 years of age have special nutritional needs. Those with limited incomes are at increased risk for developing nutrition and health-related problems. ES and the Food and Nutrition Service (FNS) have collaborated to develop nutrition education programs that target these populations. CES nutrition educators will plan and conduct nutrition education programs with families enrolled in the Federal Supplemental Food Program for

WIC. This program received \$3,530,000 in funds for FY 1993 and \$4,265,000 in new funds for FY 1994. The CES partners at the 1862 land-grant colleges and universities in all 50 States and the territories (56 total) have developed plans of work (for \$30,000 each) for implementation of the initiative and are now in their second year of implementation. In 1994, \$5,519 in additional funds was awarded to each State and territory to augment the existing plans. In addition, 18 competitive projects (up to \$200,000 each) are now in their second year of implementation.

The focus of the nutrition education projects varies from increased knowledge in basic nutrition and promotion of breastfeeding to resource management and parenting and life skills. There were several different delivery modes that were identified, including interactive computer, distance learning, videos, mobile van, and interactive CD, as well as classes and one-on-one instruction. Ethnic origins included Vietnamese and other Southeast Asians, Hispanics, Haitians, Pacific Islanders, Native Americans, and African Americans. The initiative has helped to foster stronger working relationships between WIC and CES.

To help ensure the initiative has a strong evaluation component, ES and FNS are working with ERS. The majority of the project directors decided to use the Expanded Food and Nutrition Education Program evaluation/reporting system to gather the data.

#### **d. Special Programs**

- Extension Targets Vulnerable Audiences

There were many efforts in ES to target vulnerable audiences. Each program had its unique features yet built on the strengths of other programs.

- Extension Service Involvement in "The National Project To Develop a Strategic Plan for Changing the American Diet"

The Centers for Disease Control and Prevention (CDC) and the Association of State and Territorial Health Officials (ASTHO) joined in 1993 to sponsor a National Strategic Planning Project to create a new approach to dietary change. The plan contained a vision for the year 2000 that could be shared by business and industry, the nonprofit sector, and government and suggested strategies and tactics built around cooperation and shared values. In 1994, ES continued its involvement in this project by working with strategic planners to (1) increase the demand and provide adequate options for healthy food; (2) enable people to make informed food choices; and (3) create public-private partnerships to share responsibility for action.



- Link Between ES and the ARS Children's Nutrition Research Center

In March 1993, a partnership was formed between the ES, ARS, and the Children's Nutrition Research Center at Baylor College of Medicine. The purpose of the partnership is to encourage interaction between nutrition research and nutrition education and to provide leadership to expand ES educational efforts in maternal and child health. This linkage also provided Center scientists and others with feedback regarding research needs of target populations.

Accomplishments to date are listed next.

- Studied protocols and established contacts with Center scientists. These linkages were expanded to other members of the medical and research communities, including Federal agencies, universities, and organizations that focus on issues of maternal and child health.
- \* Conducted an extensive needs assessment related to maternal and infant health, where responses were secured from 49 of the 50 States and 3 of the 6 U.S. territories. The needs assessment identified areas of research and training in maternal and infant health that ES and ARS can incorporate into future policy and planning discussions.
- Formed linkages with Texas A&M administration and subject-matter specialists, the staffs from Prairie View A&M, Texas Health Department, Texas WIC, the March of Dimes, and the Healthy Mothers/Healthy Babies Coalition.
- Sponsored the first education satellite down-link program in the Medical Center auditorium.
- Reviewed curricula from across the country to design a videotape that describes the research being done at the Center, and to support publication of a regular newsletter entitled *Nutrition and Your Child*.
- Consulted with professionals who plan and implement programs focusing on diverse audiences, such as Hispanics and Native Americans, and others in order to share the latest research.
- Conducted several briefings for members of Congress and their staff related to ES's role in nutrition education and the importance of nutrition research to support that role.
- Expanded Food and Nutrition Education Program

The Expanded Food and Nutrition Education Program (EFNEP) is designed to help limited-resource audiences,

especially youth and families with young children acquire the knowledge, skills, attitudes, and behavior necessary for nutritionally sound diets. It contributes to personal development and improvement of the total family diet and nutritional well-being. EFNEP programs are in all 50 States and 6 territories.

In FY 1993, 204,366 families and 456,993 youth were taught by trained EFNEP paraprofessionals and volunteers using a nutrition education curriculum. An estimated 721,412 family members were indirectly reached through an adult participant and the changes in the family's diet.

#### e. Impact

EFNEP families significantly improved their food behavior and learned to improve their economic situations by making better use of commodity foods and by spending their food dollars wisely. For example, in Wyoming, families typically saved at least \$20-\$30 per month on food after completing EFNEP, compared to their food costs before enrolling. This change occurred at the same time that their diets dramatically improved and food safety skills were put into practice.

#### f. Program Highlights

Many States with EFNEP programs established referral systems with other Federal food assistance programs, such as WIC and FSP. In 1994, 65 percent of EFNEP participants were also food stamp recipients. In at least 10 States, CES conducted nutrition education programs for food stamp recipients under the Family Nutrition Program funded by FSP.

- Adoption of Model Programs in Maternal and Infant Nutrition Education

An evaluation study began that investigates what factors facilitate the use of an infant and maternal nutrition education program in a location other than where it was first developed, as well as the barriers to its use. CES hopes to find out how to maximize the use of effective programs and build more effective curricula to reach varied target audiences. This study is being conducted by Pennsylvania State University under a cooperative agreement with ES.

### 3. Agricultural Marketing Service Programs

- Fresh Produce for Schools

AMS modified its purchase program for fresh fruits and vegetables during the 1994 school year. The change will enable schools to use fresh commodities more efficiently because of more frequent purchases and tighter delivery schedules. A total of 30.7 million pounds of fresh fruits and vegetables were purchased by AMS for the 1994 school year at a cost of \$7.7 million. Commodities purchased

included fresh apples, carrots, sweet corn, grapefruit, oranges, pears, tomatoes, and russet potatoes.

- Donated Pork Sausage Offered to Schools

Mild, bulk, uncooked sausage and cooked and uncooked sausage links and patties, formulated according to a new AMS specification, were announced for government purchase for fall and winter (1994-95) delivery to schools participating in the National School Lunch and Breakfast Programs. Commercially produced sausage can contain up to 50 percent fat, but based on FSIS standards, the maximum fat content allowed for the donated raw product was 20 percent.

- Beef Purchases Benefit Producers and Federal Feeding Programs

A beef purchase program designed to help improve prices to cattle producers and feeders was implemented in the fall and winter (1994-95) for Federal feeding programs. It included (1) domestic, frozen, boneless, beef roasts graded U.S. Select or Choice, with a fat content of under 10 percent and (2) 100-percent beef patties produced from cattle graded U.S. Standard, Select, or Choice, with a fat content between 18 and 20 percent. The purchase program augmented traditional purchases of ground beef items already destined for the school lunch program.

- Lower Fat Levels in Donated Red Meat Items

Specifications for red meat items donated to child feeding programs continue to require reduced fat levels. The rate of fat reduction for ground red meats was lowered by 1 percent from the 1992-93 school year, going from a maximum of 21 percent to 20 percent on the raw product. In actuality, most of the ground red meat averages less than 18 percent. The fat content of ground meat products with vegetable-textured protein was lowered from a maximum of 19 percent to 18 percent, with an average of about 16.5 percent. The specification for lean beef patties (with oatbran or carrageenan) remained constant at 10 percent, while the average was 7.5 percent. The maximum fat content of canned luncheon meat was lowered by 3 percent, from a maximum of 25 percent to 22 percent.

- Contract Signed for Nutrient Analyses

AMS signed a contract with ARS to analyze about 26 nutrients for each of six red meat products being distributed to schools that participate in child feeding programs. The findings will be used by AMS to respond to inquiries about the nutritional content of donated red meats, by FNS in technical assistance publications, and by ARS for nutrient composition tables.

- Turkey Sausage for Schools

During the 1994 school year, AMS successfully tested low-fat turkey sausage for the school lunch program. Turkey sausage with a fat content of up to 13 percent was tested in links, patties, and 10-pound tubes. Sausage purchases will be expanded in the future, with link and patty purchases to be made under the State Option Contract Program. Under this program, USDA buys the end item and States reimburse AMS for additional processing costs. Only the price of the raw material is charged against State entitlement.

- Canned, Boned Chicken Goes Back to School

Canned, boned chicken was offered to schools for the first time in many years. Schools have requested it as a versatile high-quality protein that does not require expensive frozen storage. The poultry is packed in 50-oz cans and has fat content of not more than 9.5 percent and salt content of not more than 0.5 percent.

- Fat-Modified Mozzarella Cheese for Schools

FCS requested that AMS provide specifications for a lower fat Mozzarella cheese. ARS developed a procedure for manufacturing a lower fat Mozzarella, and AMS is working with ARS and cheese manufacturers to provide such a product. Mozzarella cheese contains a minimum of 21.6 percent milk fat. The part-skim Mozzarella cheese purchased for the school lunch program contains a minimum of 16.5 percent milk fat. Specifications being developed would reduce the milk fat content in Mozzarella by 50 percent.

- "How to Buy" Revision Continues

Six AMS brochures—the "How to Buy" series—were revised to include dietary guidance information. The revisions were made to the booklets about meat, poultry, eggs, dairy products, cheese, and butter. Meant to inform consumers about USDA's food grades and grading services, the series has been unavailable for distribution since the early 1980's, although the agency continues to receive requests.

#### 4. National Agricultural Library (NAL) Programs

The Food and Nutrition Information Center answered over 10,000 reference questions received by e-mail, telephone, FAX, or letter. It provided publications to fill an additional 12,000 requests.

- FNIC Expands Electronic Access to Information Services

As part of the NAL Electronic Information Initiative, FNIC provides reference services and access to publications via the Internet, other information servers, and several other



electronic access points, and among them, NAL's electronic bulletin board, Pennsylvania State University's PENPages' International Food and Nutrition Database, and USDA's Nutrient Data Bank Bulletin Board. FNIC publications are also available on floppy disks.

The Food and Nutrition Service supported NAL again this year with an \$110,000 interagency agreement. The funding provides regional, State, and local FNS professionals with information services, including unlimited reference services and free document delivery services.

- USDA-FDA Foodborne Illness Education Information Center

FSIS, ES, and FDA combined resources with NAL to create the USDA-FDA Foodborne Illness Education Information Center. Part of a national campaign to reduce the risk of foodborne illness and to increase knowledge of food-related risks from production through consumption, the center's primary function is the development and maintenance of a database of educational materials. Reports from the database will be available on the Internet.

- Trust Fund Cooperative Agreement with the University of Mississippi National Food Service Management Institute

NAL received \$43,000 from the Mississippi National Food Service Management Institute (NFSMI) as part of the Trust Fund Cooperative Agreement with the University of Mississippi. The NAL Food and Nutrition Information Center and NFSMI are linked to a toll-free number at the University. Callers can obtain reference service from a nutritionist working for the institute and receive free document delivery services from NAL. FNIC's role with the institute involves providing access to information and document delivery services to Child Nutrition Program personnel.

- FDA-USDA Food Labeling Education Information Center

FDA and FSIS continued support of the Food Labeling Education Information Center with funding through interagency agreements. The center helps organizations and individuals share information about the new food label, avoid duplication of effort, and communicate consistent messages to the public. An important function is to find out where gaps exist in labeling education materials. In this way, new funding for labeling efforts can be used to fill a gap, rather than to duplicate existing activities.

- New Bibliographies and Information

The following bibliographies and resource lists were published or updated: *Nutrition Education Printed Materials and Audiovisuals: Grades Preschool-6, Nutrition*

*Education Printed Materials and Audiovisuals: Grades 7-12, Adult/Patient Audiovisuals, Audiovisuals About Basic Nutrition, Audiovisuals about Low-Fat, Low-Cholesterol Eating for a Healthy Heart, Audiovisuals About Weight Control, Audiovisuals for Nutrition Education About Diabetes, Cultural Perspectives on Food and Nutrition, Educational Materials and Journal Articles About Nutrition Issues Related to Native Americans and Alaskans, Electronic Sources of Food and Nutrition Information, Food and Nutrition Microcomputer Software Collection, Food Service Management and Nutrition Education Materials, Lead Toxicity in Children, Models and Replicas in the FNIC Collection, Selected Audiotapes in the FNIC Collection, Selected Self-Improvement and Management Audiotapes in the FNIC Collection, and Sources of Free or Low-Cost Food and Nutrition Materials.*

- Food and Nutrition Microcomputer Software Demonstration Center

The Food and Nutrition Microcomputer Software Demonstration Center is a free, on-site service at FNIC for use by educators, health professionals, consumers, and software developers. A nutritionist offers on-site assistance. Public- and private-sector software producers have donated over 220 personal computer software programs or demonstration disks and CD-ROM's. Subject coverage includes dietary analysis or diet planning, food service and planning management, food industry, nutrition education, and recipes.

- Food Irradiation Research Materials

In 1994, NAL received \$56,000 to further evaluate thousands of pages of food irradiation research reports prepared by government agencies in the 1950's and 1960's. The documents will be digitized and full texts made accessible on CD-ROM. A database is now available to assist with access to the materials until they are produced on CD-ROM.

FNIC staff are working with food irradiation experts and information systems experts to prepare these unpublished materials, which have not been readily accessible to the world research community. The first of a series of food irradiation CD-ROM's was republished in 1993 as part of the evaluation study. The disc contains about 5,000 pages of U.S. Army Quartermaster Corps research reports.

## **C. Nutrition Education and Information Highlights**

### **1. Implementation of the Dietary Guidelines for Americans in the Child Nutrition Programs**

All comments were analyzed and carefully weighted as the Department considered policy options and opportunities to bring school meals into compliance with the Dietary Guidelines. A discussion of the concerns raised by commentators was included in the preamble to the

Department's proposed rule on Nutrition Objectives in the National School Lunch and School Breakfast Programs, published on June 10, 1994. The Department considered more than 14,000 comments received during the 90-day official comment period for that proposed rule.

As the 1994-95 school year began, FCS Team Nutrition produced materials to educate parents about school lunch. The "Parent's Guide for Healthy School Meals"—distributed in partnership with the National Parent Teacher Association—included tips for parents' involvement in improving the school meals served to their children. In addition, FNS produced a "Be Bright, Eat Right" magnet and a bookmark that lists 10 tips from the parent's guide. PTA distributed the guide to parents of school-aged children through their 27,000 local chapters.

In the fall 1994, FCS distributed new low-fat, low-cost recipes to 23,000 school districts. The recipes, developed through a national contest sponsored by the American Culinary Federation, are part of FNS efforts to help school food service personnel provide meals that meet the *Dietary Guidelines*. FNS also made available family-size versions of the recipes.

## **2. Nutrient Standard Menu Planning Method for the National School Lunch and School Breakfast Programs**

National training for the demonstration projects that test Nutrient Standard Menu Planning (NSMP) was conducted over a 2-week period. This training included staff from 24 States, 7 USDA-FCS regions, and 34 local schools. The NSMP training is a collaborative effort with the California State Department of Education and FCS staff. The training package is designed to meet the "train the trainer" concept and consists of an instructor's manual, trainer's manual, 240 colored slides, a video and computer-assisted instruction of *Dietary Guidelines for Americans*. A minimum of about 10 hours of a scheduled 23-hour training session is spent with computer instruction and practice. The training package includes: *Dietary Guidelines for Americans*, *Food Production*, *Nutrient Standards*, *National Nutrient Database*, *Standardized Recipes*, *Food Procurement*, *Program Requirements*, and the *ABC's of Menu Planning and Marketing*.

- National Nutrient Database for Child Nutrition Programs

Work continued by FNS and the ARS Nutrient Data Lab on development of the National Nutrient Database for Child Nutrition Programs. The database includes 2,000 reference foods, all of the USDA-donated commodities, the USDA quantity food service recipes with nutrient analysis, and a limited number of brand-name processed foods. The first release of the data for use by the software industry was

January 1994. The interagency agreement is expected to continue indefinitely.

- Cooperative Review of Nutrient Analysis Software for School Meal Programs

An interagency agreement enabled FCS and NAL to collaboratively test industry-produced software packages for nutrient analysis of school meals. This testing was based on the School Food Service Software Specifications document developed by the FCS to meet the program requirements of the Nutrient Standard Menu Planning System. Ten software programs were reviewed and tested by a team of six.

- School Meal Program Recipes Promoted

A cooperative agreement was signed with the Hotel, Restaurant, and Recreational Management School of Pennsylvania State University for development of a "Recipe Promotion and Training Package." This package includes a training manual, a promotion (marketing) manual, and promotional support material in the form of colored photography, posters, menu board instructions, and translites for menu light boards. The training manual deals with correct preparation of the new USDA National School Lunch and School Breakfast Program recipes. Topics include: use of proper ingredients, measuring techniques, yield adjustments, and modifying and standardizing local recipes.

- New School Menu Planning Guide

A contract was signed with Electronic Learning Facilitators to build a training package that fits the New Menu Planning Guide for the National School Lunch and School Breakfast Program. This new guide addresses how to plan and serve healthy meals and use one of the three menu systems allowed. The training package includes a training manual and computer-assisted instruction. Topics in the Menu Planning Guide are nutrition guidance, menu planning, purchasing food, recipes, food preparation, nutrition education, sanitation and safety, food quality-merchandizing-marketing, and offer versus serve. The guide also includes sample food-service management forms, program requirements, and supplemental information.

- New Recipes for Child Care Feeding Programs

A cooperative agreement was signed with the Hotel, Restaurant, and Recreational Management School of Pennsylvania State University for development of 75 new recipes for the Child Care Feeding Program. This work involves development, testing, standardization, and nutrient analysis. The recipes are written for 25 and 50 servings and will provide child care center providers with a wide variety of new, healthy recipes.



- Nutrition Materials Translated

Two USDA publications were translated into Spanish: *Nutrition Guidance for Child Nutrition Programs* and *Making Healthy Food Choices*.

### 3. Breastfeeding Promotion Efforts

Promotion of breastfeeding continues to be a major emphasis of WIC. Since June 1990, the Department has met with the Breastfeeding Promotion Coalition to exchange information and consider joint efforts to promote breastfeeding. Over 25 national organizations participate, including major health professional associations, advocacy organizations, and Federal agencies. The Department convened a meeting of the BPC in June 1994.

In response to a December 1993 General Accounting Office report to Congress entitled "Breastfeeding: WIC's Efforts to Promote Breastfeeding Have Increased," USDA initiated efforts with DHHS to develop written policies on contradictions to breastfeeding. DHHS is establishing a panel for this purpose.

A new breastfeeding promotion packet, *Breastfed Babies Welcome Here*, was developed for child care providers in the Child and Adult Care Food Program. The packet consists of three materials: (1) a poster to display in homes and centers where parents will be able to see it, (2) a mother's guide that encourages breastfeeding and provides information on the transition of breastfed infants into a child care setting, and (3) a guide for child care providers on caring for breastfed babies and safely storing and handling breastmilk.

### 4. 1890 Institution Capacity Building Grants Program

This program is the crux of USDA's high-priority initiative to advance the teaching and research capacity of the 1890 land-grant institutions and Tuskegee University. Administered by Cooperative State Research, Education, and Extension Service, the program is competitive in nature and provides support for teaching and research projects in targeted areas.

In FY 1994, three teaching projects in human nutrition and food science were funded:

- Delaware State University was awarded \$150,891 for a project entitled, "Strategic Planning Workshop on Undergraduate Education in Food and Nutrition." This project will sponsor a national workshop on enhancing undergraduate education in food and nutrition sciences at historically black colleges and universities. Each of these schools with a food and nutrition program will be invited to send a faculty

representative. The target date and location for the workshop is April 1996 in Atlanta.

- Delaware State University was awarded \$197,057 for a project entitled, "Strengthening Food and Nutritional Sciences at Delaware State University." This project proposes to (1) establish eligibility for approval as a Didactic Program in Dietetics and in the interdisciplinary analysis of food- and nutrition-related problems and policies; (2) expand field-based learning experiences for students; and, (3) recruit and retain highly qualified students by offering scholarships.
- South Carolina State University was awarded \$182,692 for a project entitled, "Increasing Student Enrollment and Retention in Nutrition and Food Service." The goal of this project is to increase the enrollment and retention of students in the Department of Home Economics' Nutrition and Food Service programs. Teachers and counselors will develop career materials and students will participate in summer sessions and mentoring programs.

Three research projects were also funded in 1994:

- Prairie View A&M University received \$259,580 for a project entitled, "PreSlaughter Flushing and PostChill Washing of Broiler Carcasses to Ensure Food Safety." To eliminate salmonella and E. coli 0557:H7 strain 932, the preslaughter flushing of chickens and postchill washing of carcasses with an approved bactericide will be conducted to attempt to acquire zero tolerance of fecal material.
- Lincoln University received \$275,732 for a project entitled, "Health Benefits of a Weight-Loss Program for African Americans." The goal is to develop a comprehensive weight-loss and wellness program for rural African Americans based on nutrition education, behavior modification, and exercise. The project will provide opportunities for faculty and technical staff to gain research skills in obesity and energy metabolism and acquire improved laboratory equipment.
- South Carolina State University received \$296,715 for a project entitled, "The Impact of Just-in-Time Production on the Quality of Food Products in South Carolina." It is hoped this project will minimize waste. The results will be valuable in particular to the State's small, emerging food processors.

### 5. Recruitment and Retention of Public Health and Community Nutritionists

FNS, the National Association of WIC Directors (NAWD), and the Association of State and Territorial Public Health Nutrition Directors (ASTPHND) formed a working group in

June 1992, to study the lack of available public health and community nutritionists for hire. Two workshops on recruitment strategies were held in May 1993 and January 1994. A primary goal was to develop and implement coordinated strategies among different national organizations that will assist State and local agencies in their recruitment and retention efforts. A final report summarizing the discussion at the second workshop was developed and distributed in January 1995.

FNS is also overseeing several projects related to the recruitment and retention of nutritionists in public health and community nutrition programs. The agency funded a proposal from the Texas WIC program to develop a videotape promoting WIC as a unique employment opportunity for nutritionists. The video was disseminated to WIC agencies in June 1995.

- Grant funding was awarded to Dr. Janice Dodds, University of North Carolina, to support development of skills-building training modules, which are to help public health nutrition program directors write a greater range of position descriptions for nutritionists and revise personnel classification systems at the State and local levels to create more career advancement opportunities. The modules will be a companion piece to the 1991 publication, *Personnel in Public Health*. The completion date for the grant was April 1996. Dissemination of the training modules and establishment of a telephone line to address questions and obtain feedback about the modules will be implemented under a second phase of the project. The second phase will be funded by CDC.
- Grant funding was awarded to the Public Health Nutrition Practice Group of the American Dietetic Association for development of public health nutrition practice guidelines. These guidelines will outline knowledge and performance competencies needed in development of general public health nutrition training programs, and they will provide a basis for establishment of a specialty certification for public health nutritionists. The completion date was May 30, 1995.

FCS arranged to disseminate one copy of the American Dietetic Association's manual entitled, "Developing a Dietetics Education Program" to each WIC State agency in early 1995. The manual tells how to write a self-study analysis for supervised practice programs. FNS will compile a listing of approved Applied Professional Practice Programs (AP4) in public health or community nutrition settings willing to provide information about their programs, and WIC State agencies may then contact these programs for information.

- Celebrating Diversity: Approaching Families Through Their Food

A new book, *Celebrating Diversity: Approaching Families Through Their Food*, was published cooperatively between USDA and DHHS. Nutrition educators can use the book as a tool in effectively communicating with people from a variety of cultural backgrounds.

- Pregnancy Nutrition Video Distributed

A videotape, "*Healthy Foods, Healthy Baby*," developed by the Philadelphia Department of Public Health was duplicated and distributed to WIC State and local agencies. Available in English and Spanish, it is hoped the tapes will motivate young women to take care of themselves during pregnancy by providing them with nutrition guidance.

- Padres Hispanos en Accion

FNS entered into an interagency agreement with the Head Start Bureau, Administration for Children, Youth, and Families to publish a series of Head Start technical assistance resource materials. The theme is nutrition education and the audience is parents of Hispanic children enrolled in Head Start. The educational project will focus on Head Start grantees in the 20 States with the highest Hispanic enrollment and migrant programs. State nutrition education and training program coordinators or alternate State agency designees and bilingual trainers, in each of the selected States, will conduct training programs for Head Start staff. Head Start staff will, in turn, provide nutrition education programs for parents, utilizing the special Spanish language materials.

- Preschooler Nutrition Activity Booklet

The booklet suggests age-appropriate nutrition activities for preschoolers in WIC and Commodity Supplemental Food programs. It provides tips to parents and teachers on how to help children eat healthful diets. Evaluation, printing, and distribution was completed in 1996.

- After You Deliver: Healthy Tips for Moms

This pamphlet will be given to women as they leave the WIC program. It will contain information on healthy eating and the importance of folic acid, breastfeeding, use of beneficial substances, and child immunizations, as required by the 1993 Agriculture Appropriations Act. The pamphlet will undergo evaluation and printing in FY 1996.

- Fetal Alcohol Syndrome Videotape

FCS is developing a videotape about fetal alcohol syndrome—one of the leading causes of birth defects in the United States. It will be targeted to Native-American



women of childbearing age and is intended to motivate women not to drink during pregnancy.

## **6. National Needs Graduate Fellowship Grants Program**

The USDA Food and Agricultural Sciences National Needs Graduate Fellowship Grants Program is a competitive program that helps meet the nation's ongoing need for food and agricultural scientific and professional expertise. The fellowships encourage outstanding students to pursue and complete graduate degrees in the following areas: in even-numbered fiscal years, biotechnology—animal; human nutrition and food science; and marketing or management—food, forest products, or agribusiness; in odd-numbered fiscal years, biotechnology—plant; engineering—food, forest, biological, or agricultural; and water science. Before FY 1994, the program had supported the graduate degree programs of about 700 graduate students.

A total of \$648,000 was awarded to support 11 new fellows in food science at the University of Minnesota, University of Nebraska, Purdue University, University of Wisconsin, and University of Massachusetts. Another \$540,000 was awarded in human nutrition to the University of California, Davis, Tufts University, University of Chicago, University of California, Berkeley, and University of Wisconsin to support 10 new fellows.

## **7. Higher Education Challenge Grants**

The Higher Education Challenge Grants Program, helps colleges and universities produce graduates capable of strengthening the nation's food and agricultural scientific and professional work force. Projects supported by the program— (1) address a regional, State, national, or international educational need, (2) involve a creative way of addressing the need, which can serve as a model to others, (3) encourage and facilitate better working relationships in the university science and education community, and between universities and the private sector, to enhance program quality and supplement available resources; and (4) yield benefits that will continue after the project ends and USDA support stops.

Four of the 24 grants awarded in 1994 were for projects in human nutrition and food science:

- Kansas State University received \$79,479 for a project entitled, "Expanding Undergraduate Education for Food Industry Personnel via Technology." This project will result in the redesigning of Kansas State University's distance delivery food science courses. Course materials will be updated to enhance interactions and collaborative learning between faculty and students.

- Purdue University received \$67,585 for a project entitled, "Interactive Video and Clinical Reasoning in Undergraduate Dietetic Students." This project involves development and testing of a prototype computer program that presents a simulated hospital encounter between a dietitian and a patient with cardiovascular disease. New technology will allow the student to give patients more complete nutrition assessment and counseling.
- Texas A&M University received \$22,784 for a project entitled, "Global Dimensions of Human Malnutrition: Undergraduate Studies." A video entitled, "Food and Nutrition Among the Indigenous Peoples of Mexico," will be developed in conjunction with the Texas A&M University Educational Broadcast Services (KAMU-TV) and will be made available to undergraduate nutritional science programs at universities across the nation.
- University of Georgia received \$62,620 for a project entitled, "Instructional System To Model the Role of Nutrients as Risk Modifiers in Disease." This is a collaborative effort between the University of Georgia and Claflin College, a historically black institution. The project will develop a computer-assisted educational method focusing on health issues, using current scientific literature. A text will be published so teachers and students at other institutions can use the program.

## **8. Nutrition Education and Training Program**

- The Strategic Plan for Nutrition Education

The Nutrition Education and Training (NET) Strategic plan outlines measurable program goals with a target date of the year 2000. The plan is a guideline by Federal and State planners as they develop and implement NET programs and provide nutrition education services to children, their parents, their caregivers, and food service personnel. The plan was completed in spring 1993.

- Needs Assessment Guide for the NET Program

This how-to guide provides information about planning and conducting a needs assessment, as described in the NET program regulations. Detailed information is included on the use of various needs assessment methods, such as written surveys, interviews, and focus groups. Training in using the guide was provided at four USDA regional conferences in spring 1994.

- National NET Conference “Nutrition Education: Bridging the Gap Between Food and Health”

The national NET conference in April 1995, Baltimore, MD, addressed current issues facing the nutrition education and training community.

- Evaluation Guide for the NET Program

The guide is an evaluation primer for federally funded child nutrition programs. The guidelines include a thorough discussion of formative, continuing, and summative evaluations. The implications and uses of obstacles to, and expectations for each type of evaluation are presented, with examples applicable to nutrition education and training projects in schools and child care settings. This guide was introduced and distributed in April 1995 at the national NET conference.

- Nutrition Education Personnel Guidelines

These guidelines identify the roles and responsibilities of nutrition education personnel working in child nutrition programs at the local, State, regional, and national levels. They were reviewed and distributed at the 1995 national NET conference.

## 9. Food Stamp Program Participants

- Nutrition Education Matching Funds Grants

Food Stamp Program (FSP) administrative matching funds are provided for State-initiated nutrition education plans conducted exclusively for the benefit of FSP applicants and participants (they do not duplicate Expanded Food and Nutrition Education Program's efforts in the States). The plans submitted by the States must be approved by the regional offices for matching funds.

In FY 1994, Food and Consumer Services approved nutrition education plans in 10 States: New York, New Hampshire, North Carolina, Oregon, Ohio, Michigan, Minnesota, Vermont, Wisconsin, and Washington. The matching grants are to enhance State and local cooperation in nutrition education activities and develop effective ways to inform people about the purchase and preparation of healthful food.

Because the targeted food stamp population is diverse; so too is the methodology of the nutrition education plans. Each plan describes program activities, participating State and local organizations, and targeted populations. The estimated matching Federal cost of the FY 1994 plans is over \$7 million.

- FSP Nutrition Education Demonstration Grants

The demonstration grants support the development, implementation, and evaluation of community nutrition intervention programs for food stamp program participants. Educational objectives focus on improving participants' knowledge, abilities, and skills in meal planning, budgeting, and food preparation. The projects started in October 1993 and final reports were submitted in September 1995.

## 10. Other Nutrition Education Efforts

- Technical Assistance Activities for Nutrition Education in the Food and Consumer Services Programs

FCS conducted more than 100 projects and supportive activities in nutrition education. Activities are described in the publication “Technical Assistance Activities for Nutrition Education in the Food and Consumer Services Programs.”

## IV. Funding Levels

Expenditures for human nutrition research, human nutrition education, and information by several USDA agencies for FY 1986-94 are summarized in table 1. The estimate for the FY 1995 budget is also included. The total amount of human nutrition research support increased from \$60.7 million in FY 1986 to \$76.1 million in FY 1992, then decreased to \$74.8 million in FY 1994, for a net increase of 23 percent. During the same period, support for human nutrition education and information rose 122 percent, from \$132.7 million to \$295 million. The total support for human nutrition research education and information in FY 1994 was \$369.8 million, or 91 percent more than that expended in FY 1986.

Table 2 shows the amount of human nutrition research support for the same period by subject and agency. Over half of the research focused on determining nutrient requirements and on health maintenance at all stages of life. About one-quarter of the effort related to development of methods for measuring nutritional status and collecting food consumption information. About one-tenth of the funds was used to measure the content and bioavailability of nutrients in foods. The funds shown in the table do not include those provided by the States or other sources nor those in conjunction with funds provided by CSRS (now CSREES).

Funds available for competitive research grants in human nutrition through the National Research Initiative Competitive Grants Program were \$4.12 million in FY 1994, a 12.5 percent increase from FY 1993.



Table 3 breaks down human nutrition education and information expenditures and budgets by subject category.

Actual expenditures and estimated support and congressional appropriations are summarized in tables 4 and 5 for the five human nutrition research centers and other ARS laboratories or centers.

ARS operates the center at Tufts University in Boston as a government-owned, contract-operated facility. It operates the center at Baylor College of Medicine in Houston through a cooperative agreement.

Support for human nutrition research at ARS regional research centers and other laboratories is shown in table 5.

Each year, all WIC State agencies combined must spend a minimum of \$8 million nationwide for promotion of breastfeeding. The actual expenditure was over \$20 million in 1994. These expenditures must be made from the States' WIC administrative grants (or other sources) and do not constitute additional Federal appropriations.

Table 1. USDA Human Nutrition Research, Monitoring, and Education Support (\$ in Millions)

	Fiscal Year									
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	actual	actual	actual	actual	actual	actual	actual	actual	actual	estimate
<b>Human Nutrition Research and Monitoring</b>										
ARS*	37.8	40.6	44.3	45.7	47.9	49.6	49.9	49.7	50.7	60.5
	12.8	6.1	7.1	7.7	7.9	8.5	9.0	7.3	9.3	0.0
CSRS	7.9	1.2	1.0	0.9	0.9	1.1	1.1	1.5	1.5	1.5
ERS	0.7	1.2	1.0	0.9	0.9	1.1	1.1	1.5	1.5	1.5
FNS	1.5	0.5	0.5	0.6	2.8	2.3	3.8	4.7	0.0	0.0
Total	60.7	55.9	60.5	61.8	67.6	72.2	76.1	75.9	74.8	74.7
<b>Human Nutrition Education</b>										
ES	73.5	73.5	75.0	75.0	74.6	77.2	77.7	80.9	82.7	82.7
ARS	0.7	0.7	1.2	1.1	1.1	1.4	1.3	1.2	1.8	2.6
FNS (FCS)	57.6	60.4	65.5	71.6	106.7	128.5	153.9	184.7	209.7	242.5
FSIS	0.4	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
NAL	0.5	0.4	0.5	0.7	0.7	0.8	0.7	0.7	0.7	0.0
Total	132.7	135.1	142.3	148.6	183.2	208.0	233.7	267.6	295.0	327.9
<b>TOTAL RESEARCH, MONITORING, AND EDUCATION</b>										
	193.4	191.0	202.8	210.4	250.8	280.2	309.8	343.5	369.8	402.6

\* HNIS functions are in ARS for 1994; FY 1995 funds are integrated.



Table 2. USDA Nutrition Research and Monitoring Support (\$ in Millions)

	Fiscal Year									
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	actual	actual	actual	actual	actual	actual	actual	actual	actual	estimate
<b>Nutrient Requirements-- Health Maintenance</b>										
CSRS*	3.7	4.8	4.2	4.0	4.2	6.0	6.2	7.1	7.7	7.5
ARS	<u>27.5</u>	<u>29.9</u>	<u>31.0</u>	<u>33.3</u>	<u>37.7</u>	<u>38.1</u>	<u>39.4</u>	<u>39.4</u>	<u>37.6</u>	<u>38.3</u>
Total	31.2	34.7	35.2	37.3	41.9	44.1	45.6	46.5	45.3	45.8
<b>Nutritional Status-- Food Intake</b>										
CSRS*	2.4	1.4	1.8	1.3	2.4	2.5	3.4	3.4	3.5	3.3
ARS†	3.1	3.9	3.9	4.0	2.5	3.3	4.5	4.1	7.1	14.0
FNS	9.9	3.2	3.9	4.8	4.9	5.4	5.2	5.1	8.5	0.0
	—	—	—	<u>0.1</u>	—	—	—	—	—	—
Total	15.4	8.5	9.6	10.2	9.8	11.2	13.1	12.6	19.1	17.3
<b>Use of Food--Food Choices</b>										
CSRS*	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.8	0.6
ARS†+NAL	1.1	1.1	1.3	1.1	1.1	1.2	2.0	1.8	0.4	0.0
ERS	0.4	0.9	0.7	0.8	0.8	1.0	0.8	1.1	1.1	1.1
FNS†	—	—	—	—	<u>0.1</u>	—	—	—	—	—
Total	1.7	2.3	2.2	2.2	2.3	2.5	3.1	3.2	2.3	1.7

—continued

Table 2.—Continued. USDA Nutrition Research and Monitoring Support (\$ in Millions)

	Fiscal Year									
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	actual	actual	actual	actual	actual	actual	actual	actual	actual	estimate
<b>Nutrient Composition—</b>										
<b>Bioavailability</b>										
CSRS*	1.6	1.0	1.4	1.2	1.2	1.8	2.4	1.6	1.2	1.2
ARS†	7.2	6.8	9.4	8.4	7.7	8.2	6.0	6.2	6.0	8.2
	<u>1.8</u>	<u>1.8</u>	<u>1.9</u>	<u>1.8</u>	<u>1.9</u>	<u>1.9</u>	<u>1.8</u>	<u>0.4</u>	<u>0.4</u>	<u>0.0</u>
Total	10.6	9.6	12.7	11.4	10.8	11.9	10.2	8.2	7.6	9.4
<b>Nutritional Impacts</b>										
<b>of Programs</b>										
CSRS*	—	—	0.1	0.1	0.1	0.1	—	0.3	0.1	0.1
ERS	0.3	0.3	0.1	0.1	0.1	0.1	0.3	0.3	0.4	0.4
FNS†	<u>1.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	<u>2.7</u>	<u>2.3</u>	<u>3.8</u>	<u>4.7</u>	<u>0.0</u>	<u>0.0</u>
Total	1.8	0.8	0.7	0.7	2.9	2.5	4.1	5.4	0.5	0.5
<b>TOTALS</b>										
CSRS*	7.9	7.5	7.7	6.9	8.1	10.7	12.3	12.7	13.3	12.7
ARS†+NAL	37.8	40.6	44.3	45.7	47.9	49.6	49.9	49.7	50.7	60.5
ERS	12.8	6.1	7.1	7.7	7.9	8.5	9.0	7.3	9.3	0.0
FNS‡	0.7	1.2	0.8	0.9	0.9	1.1	1.1	1.5	1.5	1.5
	<u>1.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.6</u>	<u>2.8</u>	<u>2.3</u>	<u>3.8</u>	<u>4.7</u>	<u>0.0</u>	<u>0.0</u>
USDA Total	60.7	55.9	60.4	61.8	67.6	72.2	76.1	75.9	74.8	74.7

— Not applicable.

\* Now CSREES.

† Former HNIS function.

‡ Now FCS.



Table 3. USDA Nutrition Education Support (\$ in Millions)

	Fiscal Year									
	1986 actual	1987 actual	1988 actual	1989 actual	1990 actual	1991 actual	1992 actual	1993 actual	1994 actual	1995 estimate
Extension Service*										
Extension (Formula estimate)	15.9	15.9	16.4	16.4	16.4	16.7	17.2	16.9	17.0	17.0
Expanded Food and Nutrition Education Program (EFNEP)	57.6	57.6	58.6	58.6	58.2	60.5	60.5	60.5	61.4	61.4
Intensive education for WIC	—	—	—	—	—	—	—	3.5	4.3	4.3
Total	73.5	73.5	75.0	75.0	74.6	77.2	77.7	80.9	82.7	82.7
National Agricultural Library										
Food and Nutrition Information Center	0.5	0.4	0.5	0.7	0.7	0.7	0.7	0.7	0.7	0.8
Nutrition Education Initiative	—	—	—	—	—	0.1	—	—	—	—
Total	0.5	0.4	0.5	0.7	0.7	0.8	0.7	0.7	0.7	0.8
Agricultural Research Service (Former HNIS) Guidance and Education Research Branch	—	—	—	—	—	—	—	—	—	—
Total	0.7	0.7	1.2	1.1	1.1	1.4	1.3	1.2	1.8	1.8
Food and Consumer Services†										
Nutrition Education & Training Program (NET)	5.0	5.0	5.0	5.0	5.0	7.5	10.0	10.0	10.3	10.3
Special Supplemental Food Program for WIC	52.6	55.4	60.5	66.6	92.5	108.6	125.7	144.1	138.2	151.7
WIC Breastfeeding Promotion	—	—	—	—	9.2	12.4	15.7	24.0	24.0	24.0
Child Nut. Dietary Guidelines	—	—	—	—	—	—	—	2.0	0.0	0.0
Food Service Management Inst. food stamp households	—	—	—	—	—	—	1.3	1.7	1.9	1.9
Grants for new ways to reach food stamp households	—	—	—	—	—	—	1.2	2.3	7.3	7.3
FDPIR Nutrition Aides Demos.	—	—	—	—	—	—	—	0.5	0.5	0.0
Center/Nutrition Policy	—	—	—	—	—	—	—	0.1	0.2	1.0
	—	—	—	—	—	—	—	—	0.0	2.2

—continued

Table 3--Continued. USDA Nutrition Education Support (\$ in Millions)

	Fiscal Year									
	1986 actual	1987 actual	1988 actual	1989 actual	1990 actual	1991 actual	1992 actual	1993 actual	1994 actual	1995 estimate
WIC Program Studies/Eval.	—	—	—	—	—	—	—	—	5.0	3.5
Children Nutrition Programs	—	—	—	—	—	—	—	—	—	—
Nutrition Studies	—	—	—	—	—	—	—	—	3.8	3.7
Disabled Child Grants	—	—	—	—	—	—	—	—	0.0	0.5
School Meals Init. Spt	—	—	—	—	—	—	—	—	3.3	20.6
Kentucky/Iowa Demo.	—	—	—	—	—	—	—	—	3.7	3.7
Food Stamp Program	—	—	—	—	—	—	—	—	—	—
Research Demo./Eval.	—	—	—	—	—	—	—	—	11.1	11.7
State Exchange Project	—	—	—	—	—	—	—	—	0.4	0.4
Total	57.6	60.4	65.5	71.6	106.7	128.5	153.9	184.7	209.7	242.5
Food Safety and Inspection Service	—	—	—	—	—	—	—	—	—	—
Nutrition Labeling	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nutrition and Sodium Info. <sup>†</sup>	0.1	0.02	—	—	—	—	—	—	—	—
Sodium Monitoring Program <sup>†</sup>	0.2	0.01	—	—	—	—	—	—	—	—
FDA-FSIS Labeling Consistency <sup>‡</sup>	—	—	—	0.1	—	—	—	—	—	—
Total	0.4	0.13	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
USDA TOTAL	132.7	135.1	142.3	148.6	183.2	208.0	233.7	267.6	295.0	327.9
NUTRITION EDUCATION										

— Not applicable.

\* Now part of CSREES.

† Former FNS.

‡ Programs discontinued.



Table 4. Agricultural Research Service, Human Nutrition Research Support (\$ in Millions)

	Fiscal Year									
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	actual	actual	actual	actual	actual	actual	actual	actual	actual	estimate
BHNRC	Gross*	7.91	8.34	8.42	8.12	8.27	8.69	9.23	9.53	18.47
	Net†	7.02	7.41	7.35	7.31	7.48	7.82	8.31	8.57	16.61
GFHNRC	Gross	6.36	6.66	7.11	7.03	7.29	7.70	8.07	8.14	8.14
	Net	5.64	5.92	6.32	6.33	6.59	6.93	7.26	7.33	7.33
HNRC	Gross	11.75	12.76	13.68	14.06	14.26	14.56	14.57	14.58	14.58
	Net	11.16	12.12	12.99	13.35	13.54	13.83	13.84	13.85	13.85
CNRC	Gross	4.43	5.43	7.65	9.07	10.43	10.43	10.70	10.71	10.70
	Net	3.93	4.88	6.99	8.34	9.63	9.91	10.17	10.17	10.17
WHNRC	Gross	3.66	4.23	4.49	4.46	4.67	5.02	5.11	5.16	5.16
	Net	3.25	3.76	3.95	4.01	4.22	4.52	4.60	4.63	4.64
TOTAL	Gross	34.11	37.42	41.35	42.74	44.92	46.40	47.68	48.12	57.05
	Net	31.00	34.09	37.60	39.34	41.47	43.01	44.18	44.55	52.60
Other ARS HN Research	Gross	3.65	3.18	3.01	2.96	2.96	3.19	2.25	2.74	5.30
	Net	3.24	2.86	2.65	2.66	2.67	2.72	2.03	2.47	4.89
TOTAL, HUMAN NUTRITION	Gross	37.76	40.60	44.36	45.70	47.87	49.59	49.93	50.86	62.35
	Net	34.24	36.95	40.25	42.00	44.14	45.73	46.21	47.02	57.49

\* Gross funds include overhead costs.

† Net funds represent the amount appropriated to the location.

Table 5. Agricultural Research Service, Other ARS Human Nutrition Research Support\* (\$ in Thousands)

	Fiscal Year									
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	actual	actual	actual	actual	actual	actual	actual	actual	actual	estimate
Beltsville, MD										
Gross†	—	—	128.7	121.8	116.8	125.1	—	—	—	—
Net‡	—	—	111.8	109.6	105.6	106.7	—	—	—	—
Ithaca, NY										
Gross	601.3	750.9	765.0	755.4	743.0	785.1	384.5	384.5	389.6	485.0
Net	533.5	675.9	676.0	679.7	671.8	669.5	346.6	346.6	350.8	436.9
Wyndmoor, PA										
Gross	667.1	303.1	—	—	—	—	—	—	—	—
Net	591.9	272.9	—	—	—	—	—	—	—	—
Peoria, IL										
Gross	985.5	982.4	1,017.5	1,007.1	1,068.1	1,144.2	738.4	738.3	749.1	748.5
Net	874.5	884.3	898.8	906.3	965.8	975.8	665.6	665.6	674.4	674.4
Albany, CA										
Gross	959.2	712.7	653.8	493.0	483.9	519.7	530.2	641.1	834.0	1,192.5
Net	851.1	641.5	576.3	443.6	437.6	443.2	478.0	578.0	750.8	1,074.4
Hyattsville, MD										
Gross	433.5	432.7	443.1	580.0	545.3	613.9	600.1	710.8	721.7	—
Net	384.6	389.5	391.0	521.9	493.1	523.5	541.0	640.7	649.7	—
Headquarters										
Gross	—	—	—	—	—	—	—	—	50.0	2,650.0
Net	—	—	—	—	—	—	—	—	45.0	2,535.0
Headquarters Admin.										
	—	—	—	—	—	—	—	—	—	230.1
Total Gross	3,646.6	3,181.8	3,008.1	2,957.3	2,957.1	3,188.0	2,253.2	2,474.7	2,744.4	5,306.1
Total Net	3,235.6	2,864.1	2,653.9	2,661.1	2,673.9	2,718.7	2,031.2	2,230.9	2,470.7	4,950.8

\* Excludes human nutrition centers.

† Gross funds include overhead costs.

‡ Net funds represent the amount appropriated to the location.



## V. Coordination and Advisory Mechanisms

### A. Coordination Within the Federal Sector

- Interagency Board for Nutrition Monitoring and Related Research

The Interagency Board for Nutrition Monitoring and Related Research (IBNMRR) is cochaired by the USDA Under Secretary for Research, Education, and Economics and the DHHS Assistant Secretary for Health. IBNMRR is a major user of nutrition monitoring data and oversees the effectiveness and productivity of the National Nutrition Monitoring and Related Research Program. (The program includes all federally supported or federally conducted surveys and surveillance activities of the nutritional and health status of the population, including food composition and the food supply.) IBNMRR has three working groups: survey comparability, Federal-State relations and information dissemination and exchange, and food composition data. During FY 1994, DHHS and USDA published the Chartbook I: *Selected Findings from the National Nutrition Monitoring and Related Research Program* (DHHS Publication No. [PHS] 93-1255-2) and the Executive Summary of the Ten-Year Plan Progress for 1993, and provided support for and preparation of the Third Report on Nutrition Monitoring, published in calendar year 1995.

- Interagency Committee on Human Nutrition Research

Nutrition research is coordinated at the Federal level through the Interagency Committee on Human Nutrition Research (ICHNR). ARS represents USDA on the ICHNR and served as executive secretariat from 1993-95. The committee is cochaired by the Assistant Secretary for Health, DHHS, and the Assistant Secretary for Science and Education, USDA. ICHNR was established to improve coordination and increase the effectiveness and productivity of Federal agencies engaged in nutrition research. It is concerned with all Federally supported or conducted research on nutrition with emphasis on human nutrition and professional personnel needs in nutrition research. ICHNR also organizes and sponsors the biennial conferences for Federally supported human nutrition research units and centers. It coordinates the collection, compilation, and dissemination of information about nutrition research, including the Human Nutrition Research and Information Management system.

- Head Start Nutrition Education Advisory Committee

FCS participates in the advisory committee which: (1) reviews needs for nutrition education of children, staff, and parents of Head Start; (2) considers existing preschool nutrition curricula, audiovisuals, and other materials; (3) considers how Head Start grantees can critique the materi-

als; and (4) makes recommendations to the Head Start Bureau for a comprehensive nutrition education action plan.

- DHHS Ad Hoc Committee on Health Promotion Through Schools

FCS participates in this group, which facilitates communication and coordination of work among Federal personnel involved in health promotion through schools. Other coordinating agencies are from DHHS and the Department of Education.

- Interagency Committee on School Health

FCS is a member of the committee, which is concerned with increasing the effectiveness of Federal efforts that improve the education and health of school-aged children through school health programs.

- DHHS Federal Health Communicators

FCS participates in this group, which facilitates coordination and collaboration on health information, primarily within DHHS.

- Federal Interagency Child Care Group

FCS is a member of this group, which coordinates work among Federal personnel who work with child care programs.

- USDA-DHHS Nutrition Education Committee for Maternal and Child Nutrition Publications

This committee coordinates USDA and DHHS educational materials covering maternal and child nutrition so they are consistent and nonduplicative and so the two departments make effective use of resources. The committee identified a need to learn more about the influence of culture on nutrition and nutrition education, and several forums were held. It reviewed the publication *Celebrating Diversity: Approaching Families Through Their Food*, which resulted from the process. This publication is a guide for learning to communicate effectively with a diverse clientele.

- National Cholesterol Education Program

ARS was USDA's liaison to the National Cholesterol Education Program Coordinating Committee. ARS kept the committee informed of USDA research results from food consumption surveys of dietary status and activities that support the *Dietary Guidelines for Americans*.

- Iron Deficiency Prevention, Detection, and Management

ARS staff presented "Alternative Strategies for Increasing Iron Consumption," to the Food and Nutrition Board's Committee on Prevention, Detection, and Management of Iron Deficiency Anemia Among U.S. Children and Women of Child-Bearing Age.

- Project To Evaluate Congregate and Home-Delivered Meals

ARS staff and representatives from other agencies in USDA and DHHS served on a technical evaluation panel that awarded a contract for an Administration on Aging project. The project will evaluate the nutrition services provided under the Older Americans Act of 1965, as amended. In addition to congregate and home-delivered meals, the law authorizes the provision of nutrition education, shopping assistance, information and referral services, and recreational and social activities.

- Pesticide Data Program

The Pesticide Data Program (PDP) develops and communicates comprehensive, statistically defensible information on pesticide residues in the nation's food supply and improves government dietary risk assessment procedures. The Federally sponsored program relies on residue data collected through cooperative agreements with nine participating States and three USDA laboratories. The data are supplied to EPA for special review and reregistration of pesticides and to other government groups for safeguarding public health.

In 1993, AMS collected and analyzed 7,330 samples, performed about 30,000 analyses, and reported 58 different residues. As of April 1994, there were over 40 pesticides of priority to EPA in the program, including 5 multiresidue methods and 5 specific residue test methods. In 1994, a system for the electronic transfer of information was installed in all participating laboratories.

In response to the National Academy of Sciences' report "Pesticides in the Diets of Infants and Children" canned and frozen sweet corn and peas were added to the Pesticide Data Program in April 1994, and a national wheat survey began in January 1995. In 1994, 8,400 samples were collected and over 40,000 analyses were done. Samples are taken from 12 commodities, nine of which are highly consumed by infants and children.

- Food Safety and Pesticide Exposure

Work continued on the specifications and uses of the Food Grouping System (FGS). FGS expedites analysis of data reported in national surveys of individuals (Continuing Survey of Food Intake by Individuals and National Health and Nutrition Examination Survey) in terms of ingredients or agricultural commodities. Data generated are made

available to EPA and FDA for use in the Dietary Residue Exposure System and Total Diet Study, respectively.

During 1994, the Food Safety Working Group, cochaired by ARS, FDA, and EPA, continued work on two proposals prepared in response to a National Academy of Sciences recommendation for increasing the sample sizes of children in food consumption surveys. The first proposal called for a special survey of infants and children to supplement the sample sizes in the Continuing Survey of Food Intakes by Individuals (CSFII) 1994-96. The second proposal called for linkage of intake data from CSFII 1989-91 and the National Health and Nutrition Examination Survey (NHANES) III as a means of providing EPA with more accurate estimates of intake data for infants and children. USDA requested but did not receive FY 1995 funding for these proposals. USDA has continued to pursue funding for the special survey.

ARS continued work with FDA and EPA to improve the reporting of intake data for food safety applications and pesticide exposure assessment. EPA is interested in estimating acute and chronic pesticide exposure. Currently, available statistical methods and software are adequate for estimating acute exposure from 1-day food intake data. ARS is sponsoring research with Iowa State University to develop statistical methods and software for estimating distributions of long-term or usual food intakes.

- ARS-NCHS Analytic Working Group

Over the year, discussions were held about methodology being developed by the National Center for Health Statistics (NCHS) and ARS for determining long-term or usual food intakes. Presentations were made by Iowa State University researchers and NCHS researchers.

## **B. Coordination Within USDA**

### **1. General**

On May 23, 1994, Departmental regulation 1044-7 was issued for coordination of the USDA human nutrition programs. A Nutrition Education and Research Coordinating Council (NERCC) was established, cochaired by the Under Secretary of Research, Education, and Economics and the Under Secretary of Food and Consumer Services. All agency heads with programs related to nutrition are members. NERCC interacts with other government agencies, including Interagency Committee on Human Nutrition Research and Interagency Board for Nutrition Monitoring and Related Research. A Human Nutrition Coordinating Committee was continued, with an ARS representative as chair and an FCS representative as vice chair.



- Dietary Guidance Working Group

The Dietary Guidance Working Group of the Human Nutrition Coordinating Committee reviews all USDA publications and materials that contain dietary guidance for the general population. It also coordinates review of these materials with DHHS. In accordance with the National Nutrition Monitoring and Related Research Act of 1990, the group also reviews dietary guidance materials produced by DHHS. These reviews ensure that dietary guidance from the Federal Government accurately reflects nutrition policy as expressed in the *Dietary Guidelines for Americans* and that the guidance is supported by valid scientific or medical knowledge. About 20 materials were reviewed in FY 1994. A memorandum of understanding between USDA and DHHS to formalize the review process was signed in March 1994.

- Extension Service Collaboration

Nutrition education programs of the Cooperative Extension Service (CES) reach diverse groups, such as the food stamp program, Kiwanis International, and health departments. Because of emphasis in the Expanded Food and Nutrition Education Program to reach pregnant and parenting women and adolescents, its staff collaborated with WIC, Healthy Mothers, Healthy Babies national and State coalitions, the National Commission to Prevent Infant Mortality, the Breastfeeding Consortium, and the Maternal and Child Health Interorganizational Nutrition Group.

For FY 1993, there was new funding for an ES-WIC nutrition education initiative. All States and territories were eligible to receive \$30,000 based on an ES-approved plan of work. Plans from 50 States and 5 territories were reviewed and approved. One of the primary purposes for the funds was to increase the collaboration between CES and WIC. In addition, States and territories had opportunities to submit competitive proposals for projects up to \$100,000.

The plans and proposals were jointly developed between ES and WIC State or local staff. This planning included identifying the target audience, the focus of the nutrition education, the training to be conducted, and the evaluation methodology.

- Nutrition Impact Indicator Project

A grant continued to facilitate the CES Nutrition Impact Indicator Project. The data collection project develops and uses indicator questions that examine the knowledge and behavior of adults participating in CES diet, nutrition, and health programs. Measurement tools were developed and administered for four of the Dietary Guidelines for Americans: (1) eat a variety of foods; (2) maintain healthy weight; (3) choose a diet low in fat, saturated fat, and cholesterol; (4) and choose a diet with plenty of vegetables, fruits, and grain products.

- Child and Adult Care Food Program Advisory Committee

This committee was created to advise FCS staff on training and materials needed for the program.

- FCS-FNIC Ad Hoc Committee on Evaluation of Software Packages for NuMenus

FCS appointed the ad hoc committee to evaluate commercial nutrient analysis software for its conformity to FCS software specifications for school food service.

## 2. Extension Targets Vulnerable Audiences

ES continued its many efforts to target vulnerable populations. Each program had its unique features, yet built on the strengths of the other programs. Close internal collaboration was maintained to assure little duplication, but rather supporting and strengthening the total programming effort.

## 3. Cooperative Regional Research Projects

The Cooperative State Research Service (CSRS) administers Hatch and Evans-Allen Funds that support cooperative human nutrition research involving land-grant and 1890 universities. These projects are regional and may involve scientists from ARS, ERS, and the Center for Nutrition Policy and Promotion. The active regional projects in human nutrition are summarized below.

- Western Regional Research Project (W-143)—Nutrient Bioavailability: A Key to Human Nutrition

Understanding is limited of the dietary factors that affect the digestion and absorption of available forms of nutrients, especially vitamins and minerals. Since some of the nutrients most affected (iron, calcium, pyridoxine, folacin) appear to be marginal or low in the diets of certain population subgroups, data on bioavailability becomes critical in establishing sound dietary requirements and appraising dietary adequacy. Project objectives are to (1) determine the bioavailability of vitamins and minerals in plant- and animal-derived foods in human subjects, and (2) develop methods for determining bioavailability in vitro and in animal models in order to predict human bioavailability. This project involves 13 universities, the Western ARS Human Nutrition Research Center, and 2 representatives from industry.

- North Central Regional Research Project (NC-167)—Health Maintenance Aspects of Dietary Recommendations Designed To Modify Lipid Metabolism

The objectives of this project are (1) to determine the effects of changes in the quantities and ratios of dietary fatty acids

on physiological factors that influence health maintenance, (2) to determine the impact of diets that meet the Dietary Guidelines, (especially with regard to fat and fiber content) on aspects of lipid, lipoprotein, and energy metabolism which influence health maintenance, and (3) to assess the impact of diets which meet the Dietary Guidelines on minerals and electrolytes that influence lipid metabolism and health maintenance. This study involves collaboration among 16 universities and 2 ARS centers.

- Northeast Regional Research Project (NE-172)—Assessment of Nutritional Risk in the Elderly

This project was renewed for an additional 5 years. The revised objectives are to (1) evaluate dietary intake methods and screening protocols to identify nutritional risk in the elderly and (2) determine biochemical indicators of nutritional status as predictors of chronic disease in the elderly. This project involves researchers from nine States and ARS.

- North Central Regional Research Project (NC-200)—Behavioral and Health Factors That Influence the Food Consumption of Young Adults

The objectives of this project are to (1) identify traits, behaviors, concerns, and perceptions that influence the food consumption decisions of young adults and (2) determine the influence of cultural, behavioral, and perceptual factors and their interactions on the diet of young adults. This project involves collaboration among scientists from eight universities and ARS.

- Western Regional Research Project (W-182)—Dietary Fat and Fiber: Knowledge, Perceived Risks, and Dietary Practices

Five objectives are addressed in this project: (1) to determine respondents' knowledge and understanding of the Dietary Guidelines for fat and fiber; (2) to determine the degree to which respondents are following the guidelines; (3) to examine respondents' perception of health risks associated with intake of fat and dietary fiber; (4) to identify constraints to, and motivating factors for, following these guidelines in relation to population characteristics; and (5) to determine differences between respondents in the general population and those medically defined as being at risk with respect to knowledge and understanding of the Dietary Guidelines for fat and fiber, perception of associated health risks, and compliance with dietary recommendations. Twelve universities and ARS are involved.

- Southern Regional Research Project (S-216)—Changing Patterns of Food Demand and Consumption Behavior

The objectives of this project are to (1) develop and evaluate databases in order to understand food demand and consumption behavior; (2) estimate food demand parameters with

alternative theoretical and applied models; (3) measure, assess, and interpret changing patterns of food demand and consumption behavior in order to analyze food policies, food programs, consumer protection (for example, food safety), and consumer education; and (4) identify and assess changing patterns of food demand and consumption behavior in selected countries in order to improve understanding of food demand in U.S. export markets. This project involves about 23 agriculture economics departments, Agriculture Canada, Bureau of Labor Statistics, ERS, and the Center for Nutrition Policy and Promotion.

- Western Regional Research Project (W-122)—Improve Food Safety Through Discovery and Control of Natural and Induced Toxicants and Antitoxinants

In addition to assessing the risks of toxicants in food, the researchers plan to identify and investigate mechanisms of action of food-borne antitoxinants that may reduce risks to human health. Ten States and the Western Regional Research Center are participating.

- 1890 Regional Research Project (RR-6)—Evaluation of Effective Intervention Methods To Improve the Quality of Well-Being of Rural Elders

Most departments of human ecology within the 1890 university system are participating in this multidisciplinary project. One objective addresses the effectiveness of dietary management programs on the nutritional practices and dietary behavior of older persons.

- Northeast Regional Research Project (NE-165)—Private Strategies, Public Policies, and Food System Performance

The Food Marketing Policy Center at the University of Connecticut is associated with the project. Two objectives address nutrition issues. They are (1) the use of nutritional labels in consumers' preferences and product choices, and (2) the effect of a private firm's strategic response to food safety and nutrition regulation on competition in food markets.

#### **4. Economic Research Service and Center for Nutrition Policy and Promotion Cooperation on Food Supply Data**

ERS and the Center for Nutrition Policy and Promotion (CNPP) cooperate in publishing information on the U.S. food supply. ERS produces the data on amounts of foods consumed, and CNPP uses those data to generate estimates of the nutrient content of the food supply. In accordance with the 10-year plan for nutrition monitoring, ERS and CNPP are cooperating in finding ways to increase use and



understanding of the food supply data. They are also working closely to reconcile any data discrepancies due to differences in methodologies.

### C. Coordination With the Private Sector and International Organizations

- The Nutrition and Food Safety Education Task Force

This task force was established in 1985, as a continuation of the Sodium Education Task Force, to focus on broader issues in nutrition and food safety. Members include a wide range of Federal, industry, and consumer groups. Recent meetings included discussions of food safety, biotechnology, and consumer surveys results of interest to nutrition educators. In 1995, the task force absorbed the membership of the Food Labeling Education Dialogue Group (FLEDG). Because many food labeling education projects are now well established, FLEDG members decided a separate committee devoted to food labeling education was no longer needed.

- National Organic Standards Program

Recommendations for a certification program in accordance with the National Organic Standards Act of 1990 were developed by the National Organic Standards Board working with AMS. The board comprises farmers, handlers, retailers, consumers, scientists, and environmentalists. Recommendations have been presented to USDA in the areas of crop standards; livestock standards; processing, handling, and labeling; materials; accreditation; and international concerns. USDA proposed rules for implementation of the program in 1995.

- Extension Service Involvement in "The National Project To Develop a Strategic Plan for Changing the American Diet"

CDC and the Association of State and Territorial Health Officials (ASTHO) joined in 1993 to sponsor a national strategic planning project to create a new approach to dietary change. In 1994, ES continued its involvement by working with strategic planners to (1) increase the demand and provide adequate options for healthy food; (2) enable people to make informed food choices; and (3) create public-private partnerships to share responsibility for action.

- Interagency Task Force for Native-American Nutrition Education

In FY 1994, the task force conducted two meetings and one conference call. The task force ensures that materials about nutrition and health are disseminated to Native-American organizations and keeps these organizations abreast of nutrition education activities and opportunities at the

Federal level. The task force is also exploring the possibility of identifying culturally appropriate nutrition modules for inclusion in Native-American school curricula.

- National Healthy Mothers, Healthy Babies Coalition

FCS serves on the executive board of this coalition and chairs the Breastfeeding Promotion Committee. The coalition is composed of over 100 members representing national voluntary organizations, health professional organizations, and the Federal Government. The coalition promotes public education in maternal and child health and shares information among member organizations.

- Food Supply Information

ERS and CNPP cooperate with many commodity trade organizations, industry groups, and university experiment stations in the process of collecting and analyzing food production and consumption data. Many procedural changes eventually instituted by ERS and CNPP are first submitted to such expert groups for comments. ERS and CNPP also provide the U.N. Organization for Economic Cooperation and Development with data concerning the U.S. food supply.

- Maternal and Child Health Interorganizational Nutrition Group

FCS is a member of this partnership of national, professional, voluntary, and Federal agencies concerned with improving the nutrition status of mothers, children, and families.

- American Academy of Pediatrics, Committee on Nutrition

FCS is a liaison to this group. The group acquires data that form the scientific basis for practical nutrition, as presented in the *Pediatrics Nutrition Handbook* and committee statements.

- American School Health Association (ASHA), Council on Nutrition Education and School Food Service, and Council on Early Childhood Health Education and Services

FCS participates in the councils, which assist ASHA members with promoting and conducting nutrition education and food service activities.

### D. Advisory Groups

- National Nutrition Monitoring Advisory Council

The nine-member council provides scientific and technical advice about development and implementation of the coordinated program and comprehensive plan for the

National Nutrition Monitoring and Related Research Program. The council serves in an advisory capacity to the Secretaries of USDA and DHHS.

- National Advisory Council on Maternal, Infant, and Fetal Nutrition

The council met in 1993 to develop a report on issues relevant to the Special Supplemental Food Program for WIC and the Commodity Supplemental Food Program. These issues included full WIC funding, funding formulas, allowable costs, purchase of breast pumps, the Baby-Friendly Hospital Initiative, folate, Healthy Start, and vendor management incentives. Recommendations adopted by the council were included in its 1994 biennial report to the President and Congress.

- Advisory Committee for National Food Service Management Institute (NFSMI's) Project on Nutrition Education Personnel

FCS participates in this group, which identifies the roles and responsibilities of nutrition education personnel who work with child nutrition programs at local, State, regional, and national levels.

- Advisory Committee for the Implementation of the National Health and Safety Performance Standards Guidelines for Out-of-Home Child Care Programs

FCS participates in the advisory committee whose goal is to promote the use of national health and safety standards in out-of-home child care programs.

- National School Health Education Coalition

FCS is a member of the coalition whose goal is for every student in preschool through grade 12 to receive a comprehensive school health education experience.

- Human Nutrition Board of Scientific Counselors (HNBSC)

The board was not funded for 1994.

## **VI. Benefits**

At FNS, nutrition education and nutritional updating of programs was a central focus. The School Meals Initiative was announced. This initiative includes numerous activities that assist 90,000 schools in providing meals consistent with the principles of the *Dietary Guidelines for Americans*. It also includes activities that encourage students to choose more nutritious meals. The WIC program continued its growth toward full participation of eligible citizens, resulting in nutrition education for a record number of pregnant, breast-feeding, and postpartum women and caretakers of infants and children under the age of 5 years. This includes

WIC nutrition education services for the families of more than 40 percent of all infants in the United States. The FNS focus on nutrition education also resulted in a significant increase in nutrition education activities in the Food Stamp Program.

FNS research provided needed information on the nutritional risks, dietary patterns, and food security of program participants and on the nutrient content of meals offered through Federally reimbursed meal programs. Findings from the 1992 census of WIC participant characteristics and similar collection of data from over 6 million participant records for the 1994 biennial report to Congress were published in fiscal year 1994. These studies included information on the nutritional risk characteristics of WIC participants at the time of certification. FY 1994 laid the groundwork for future research on nutrient intake and food security of participants in food assistance and nutrition education programs.

A food security symposium was held, and subsequently, a questionnaire to measure food security was developed in cooperation with the Census Bureau and participants in the symposium. An agreement was reached with the Census Bureau to include the questionnaire in the Current Population Survey for April 1995, and annually thereafter. Work continued on the first national study of the dietary intake of and meals offered to, children in child care settings, which will help identify needed nutritional improvements.

FSIS and FDA's Office of Food Labeling have worked to harmonize nutrition labeling so that consumer information on regulated food products will be presented as consistently as possible. The new nutrition labels provide nutrient composition and serving size information to consumers and facilitate comparisons of nutritional qualities of products within and among food categories. The manufacturers' requirement for and the consumers' use of nutrition labels should act as an incentive to manufacturers to improve the nutritional qualities of existing and new food products. The nutrient information, the standardization of serving sizes, and the presentation of Daily Values on nutrition labels should improve consumers' awareness of nutrition when making food choices. It is expected that with informative and systematic nutrition labeling, accompanied by educational efforts on this and other aspects of dietary guidance, the health status of the American population will benefit.









